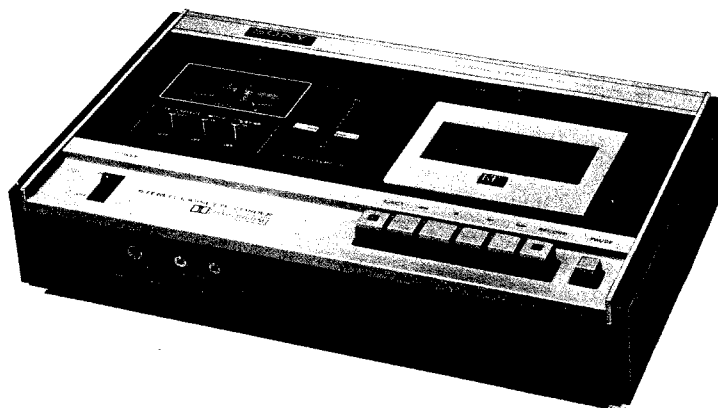


TC131SD



SPECIFICATIONS

Power Requirements:	AC 120V 60 Hz (USA, Canada) 110, 127, 220, 240 V 50/60 Hz (AEP, AUS) 100, 110, 120, 127, 220, 240 V 50/60 Hz (E)	Outputs:	LINE OUT (2) Load impedance: greater than 10 k Ω Level: 0.775 V (0 dB) with 100 k Ω load
Power Consumption:	11W		HEADPHONE Load impedance: 8 Ω Level: 31 mV (-28 dB)
Track:	Two-track two-channel stereo		
Frequency Response:	With chromium dioxide cassette 40 ~ 15000 Hz (NAB) 50 ~ 12000 Hz (DIN) With ordinary cassette 40 ~ 13000 Hz (NAB) 50 ~ 10000 Hz (DIN)	REC/PB Connector:	Input impedance: less than 10 k Ω (AEP, E, AUS) Output impedance: less than 50 k Ω
		Semiconductors:	32 transistors and 20 diodes
Overall Signal-to-Noise Ratio:	48 dB (DOLBY NR switch to OFF) (With DOLBY NR switch to ON, S/N ratio improves 5 dB at 1 kHz and 10 dB at 5 kHz.)	Record/playback Head:	PF145-3602A6 (ferrite)
Wow and Flutter:	0.22% (NAB) (RMS weighted) \pm 0.38% (DIN)	Erase Head:	EF135-36
Record Bias Frequency:	Approximately 85 kHz	Motor:	D-015G (DC governor)
Inputs:	MICROPHONE (2) Impedance: low Maximum sensitivity: 0.2 mV (-72 dB) LINE IN (2) Impedance: 100 k Ω or more Maximum sensitivity: 0.06 V (-22 dB)	Accessories:	Connection cord RK-74 (2) Printed matters Cleaning tips (AEP, Canada, E, AUS)
		Dimensions:	388 (w) x 95 (h) x 230 (d) mm 15 5/16 (w) x 3 3/4 (h) x 9 1/16 (d) inches
		Weight:	4.1 kg, 9 lb 1 oz (USA, Canada) 4.5 kg, 9 lb 15 oz (AEP, E, AUS)


SERVICE MANUAL

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MODEL IDENTIFICATION (See specification label)

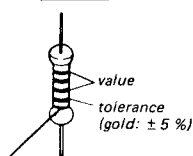
Model	Identification on specification label
USA	AC 120V 60Hz
Canada	AC 120V 60Hz
E	AC 100, 110, 120, 127, 220, 240V 50/60 Hz
AEP	110, 127, 220, 240V 50/60 Hz 
AUS	110, 127, 220, 240V 50/60 Hz

CAUTION

- Record and playback level adjustments should be carefully made. The levels must be as specified for correct DOLBY circuit operation.
- When replacing resistors and capacitors needing $\pm 2\%$ tolerance, use only those with red line (or dot) or G mark, as DOLBY system requires precise circuit operation.

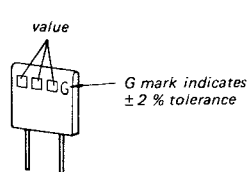
$\pm 2\%$ Tolerance Identification

Resistor



Red line (or dot) indicates $\pm 2\%$ tolerance selected from resistors of $\pm 5\%$ tolerance.

Capacitor



When ordering replacement parts, use PART NUMBERS listed in Parts Lists or shown in EXPLODED VIEWS.
Parts List reference numbers should not be used.

All screws in this service manual are Phillips type (cross recess type) unless otherwise indicated.
(-) : slotted head

SECTION 1 OUTLINE

1-1. DOLBY NOISE REDUCTION SYSTEM *

1. OUTLINE

The TC-131SD uses a DOLBY NOISE REDUCTION system to reduce hissing noise during low level or zero level sound passages. This system pre-emphasizes the low-level high-frequency recorded signals which are disturbed by hissing noise. During playback, it de-emphasizes these signals along with tape hiss and thus improves signal-to-noise ratio.

- (1) The DOLBY system differs from other noise reduction systems as follows:
 - * High-fidelity sound cannot be obtained if the DOLBYIZED tape is played back on other systems or vice versa.
 - * Signal levels must be precisely adjusted since these levels control the DOLBY system.
- (2) The DOLBY system of the TC-131SD has the following features:

The DOLBY unit (DCB-020) contains a variable high-pass filter controlled by input level. During Record:

The DOLBY unit (DCB-020) is series-connected to boost the low-level high-frequency signal.

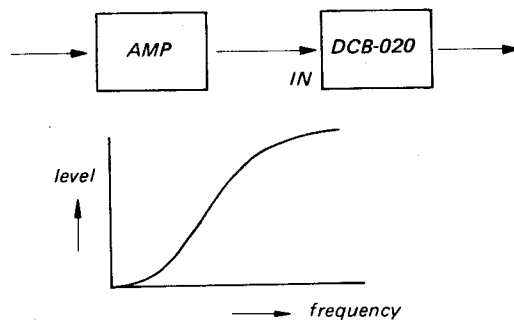


Fig. 1-1. Unit connection in record mode and frequency response

During Playback:

The DOLBY unit is connected as a negative feedback circuit to decrease the gain for low-level high frequency signals boosted during record.

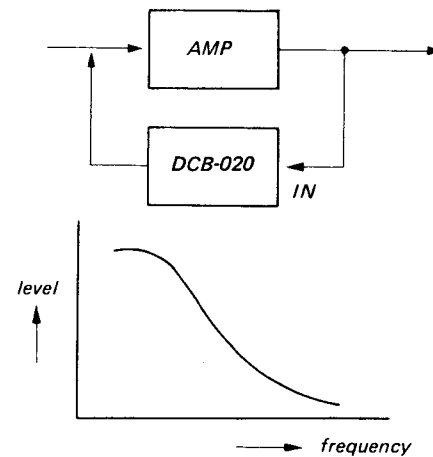
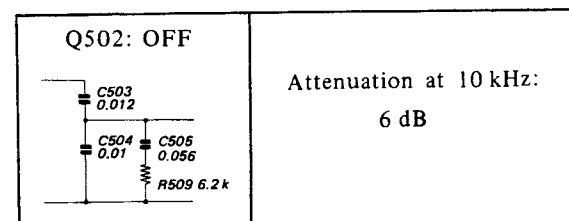


Fig. 1-2. Unit connection in playback mode and frequency response

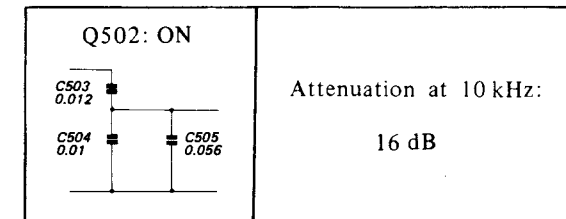
2. CIRCUIT OPERATION

(Refer to schematic diagram on page 30.)

Stage/Control	Function
R501, R502	These resistors attenuate signal level 20 dB. High resistance value is due to high output impedance of LINE OUT jack since DOLBY unit input is connected to LINE OUT jack.
Q501	This emitter-follower amplifier is an impedance-translator for the low-impedance high-pass filter.
filter C503, C504, C505 R509, Q502	Q502 changes the filter curve determined by C503, C504, C505 and R509.



Attenuation at 10 kHz:
6 dB



Attenuation at 10 kHz:
16 dB

Q502-control amplifier

Q505, Q506, Q507

rectifier
D501, D502

C507

release time

C517, R534

C515, R530

C518, R537

This high gain (more than 50 dB) amplifier is used for flat frequency response. Normal input level of this amplifier is -56 dB (1.2 mV) at 1,000 Hz.

These diodes performing as a voltage doubler rectify amplified signals to obtain a dc component greater than 1V.

This capacitor prevents abnormal oscillation of high frequency signals. The capacitance value is small (6 pF) because the amplifier requires a short attack time.

C517 and R534 effect a release time of about 10 m sec.

C515 and R530 connected to the negative feedback circuit of Q502-control amplifier boost the high frequency signal input attenuated by the filter.

For increasing-transient inputs, C518 and R537 reduce attack time to 25 μ sec. When signal level increases suddenly, attack time—time until DOLBY system begins to operate — causes a click noise due to over-shoot as shown in Fig. 1-3. To prevent

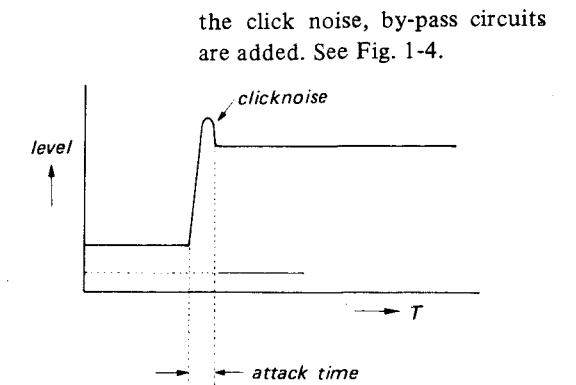


Fig. 1-3.

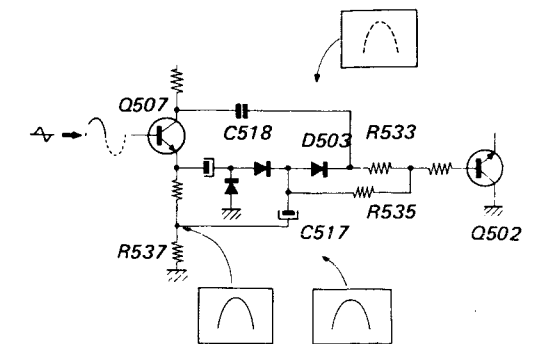


Fig. 1-4.

C513, R525

flat amplifier
Q503, Q504

R525 is series-connected to the by-pass capacitor C513 of Q505 emitter. R525 and a small value coupling-capacitor C512 decrease the control amplifier gain of low frequencies.

This stage amplifies the filter output signals.

* The word DOLBY is a trade mark of Dolby Laboratories, Inc.

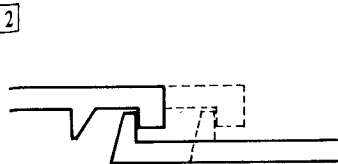
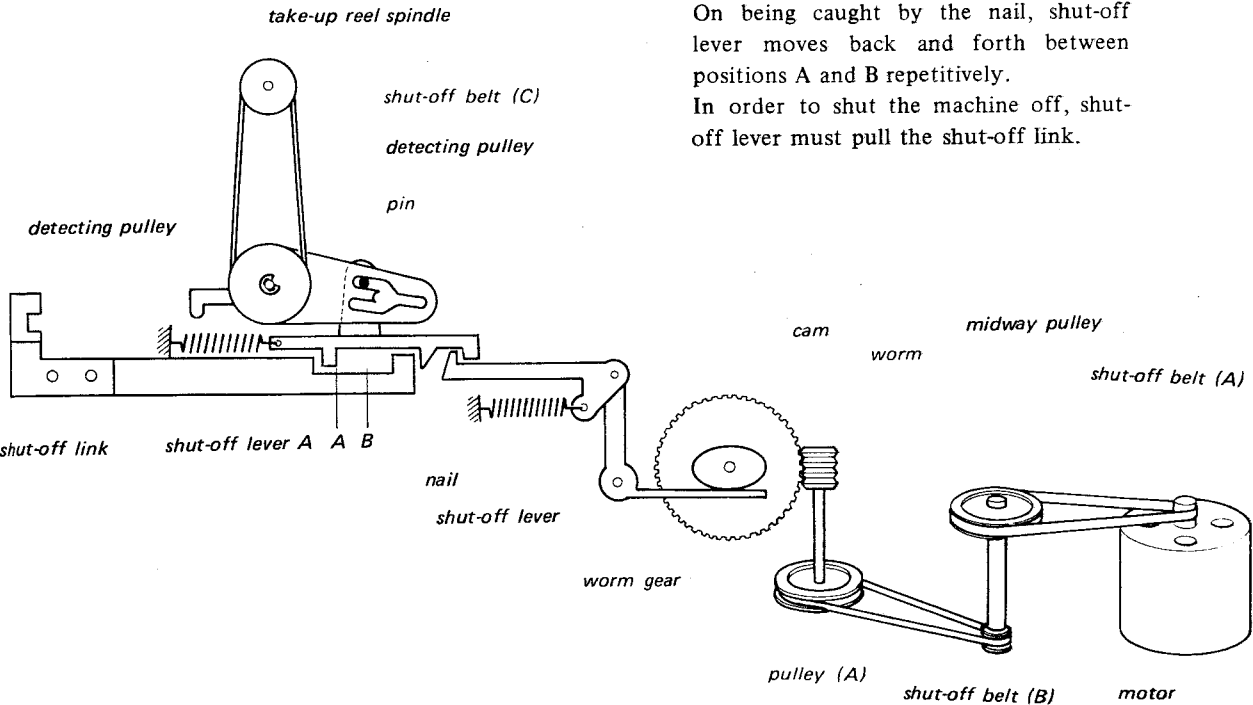
1-2. AUTOMATIC SHUT-OFF MECHANISM
.OPERATION

The TC-131SD mechanism is designed so that the unit will shut itself off automatically at tape end in any mode by detecting stop mode of take-up reel spindle.

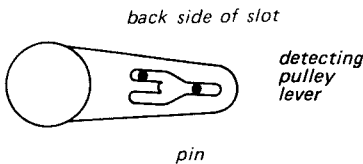
As an example, the mechanism operation in playback mode is illustrated step by step.

Playback — Normal Operation —

4 As long as tape remains on the spindle, take-up reel spindle continues to rotate. Shut-off belt (C) transmits turning force to the detecting pulley and then to the detecting pulley lever.



Detecting pulley lever operation
in playback mode.

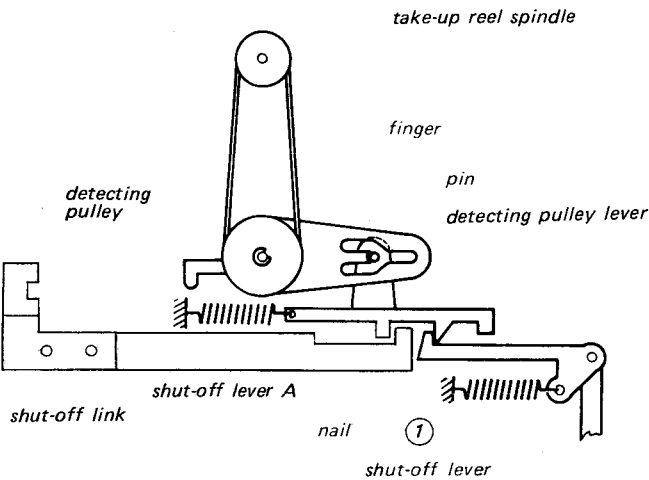
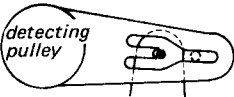


5 As a result of rotational friction on the detecting pulley lever, the pin always wants to hug the back side of the slot, (upper side as shown). The constant motion of a shut-off lever A slides the pin back and forth along the back side of the slot.

3 On being caught by the nail, shut-off lever moves back and forth between positions A and B repetitively. In order to shut the machine off, shut-off lever must pull the shut-off link.

Playback — Automatic Shut-off Operation —

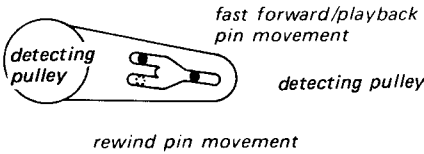
6 When tape runs out on the spindle, the turning force on the detecting pulley lever halts. When the pin starts to move inward in the slot, it no longer wants to hug the side of the slot as previously, but stops in the middle on the finger.



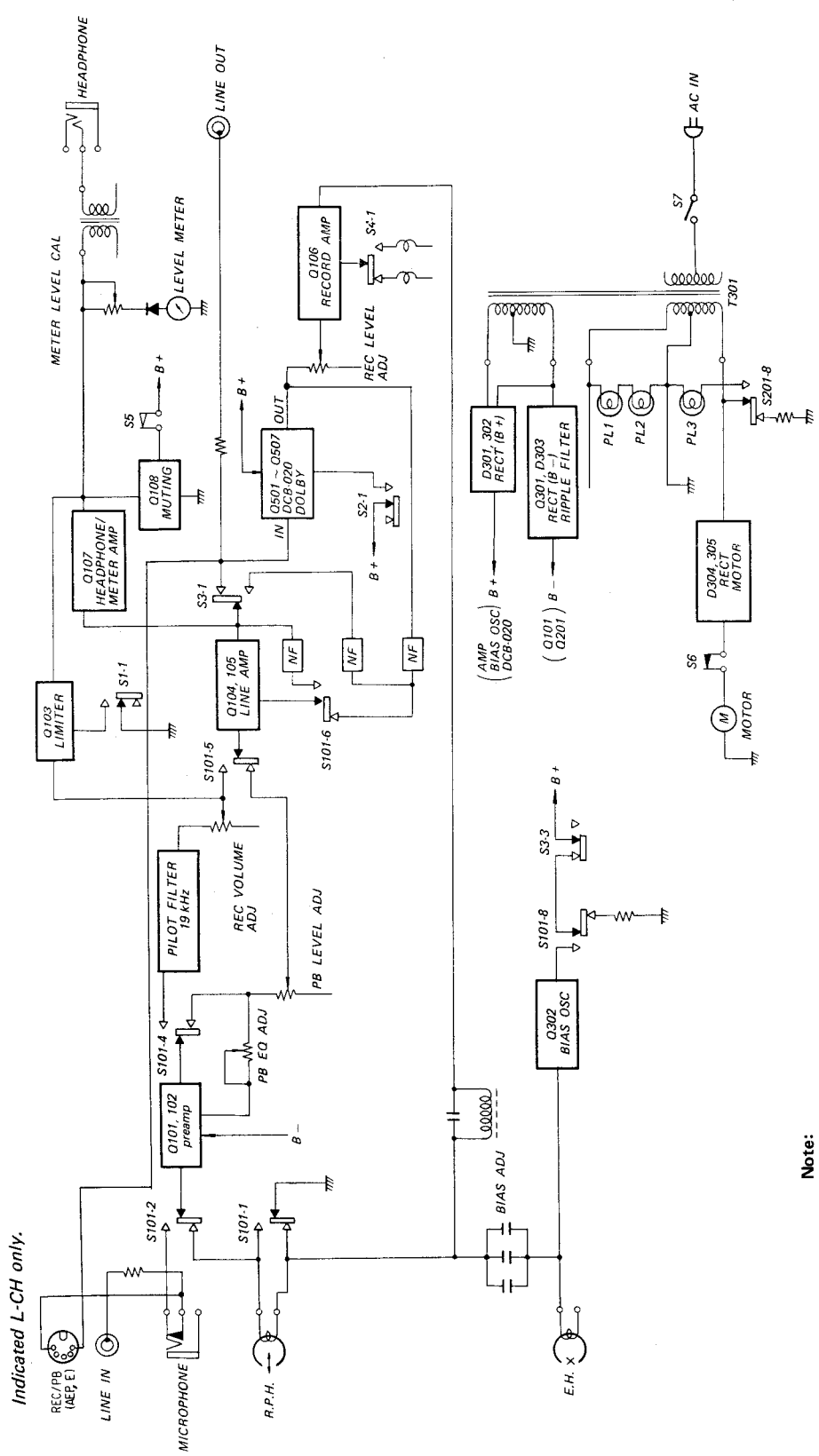
7 The finger holds the pin (and shut-off lever A) playback far enough so that the nail is able to catch shut-off lever A in position ① as shown.

8 Now shut-off lever A can move far enough to pull the shut-off link which shuts the machine off.

For fast forward, automatic operation is the same as for the playback mode. For rewind mode, the pin hugs the opposite side of the slot, as shown below.



1-3. BLOCK DIAGRAM



Note:

1. Switch Mode:

Ref. No.	Switch	Mode
S101,201	record/playback	playback
S1	LIMITER	ON
S2	DOLBY NR	ON
S3	timing	playback
S4	TAPE SELECT	NORMAL
S5	muting	OFF
S6	motor	ON
S7	POWER	OFF

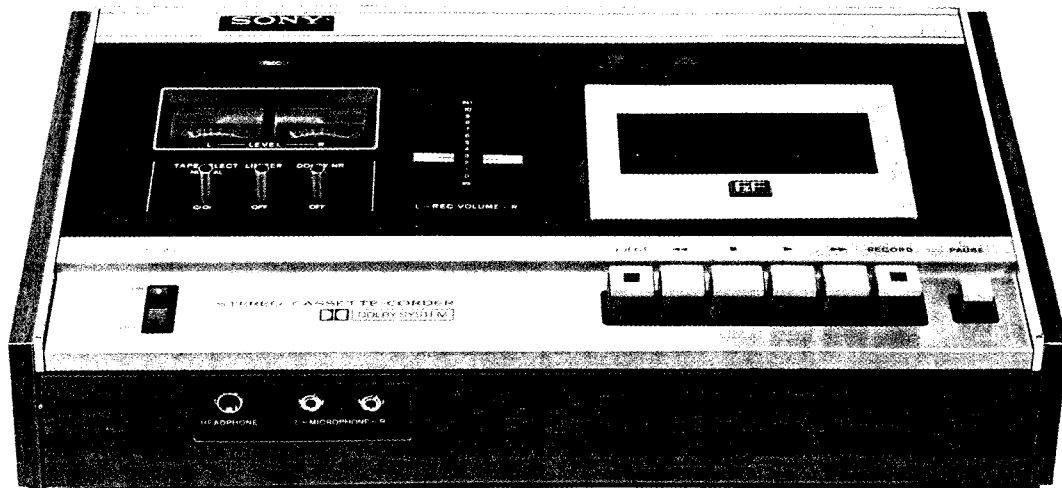
2. Timing Switch (S3) Functions in stop mode:

- * Timing switch stops the LINE OUT signal.
- * Timing switch stops the bias oscillation.
- * Timing switch cuts the DOLBY circuit OFF.

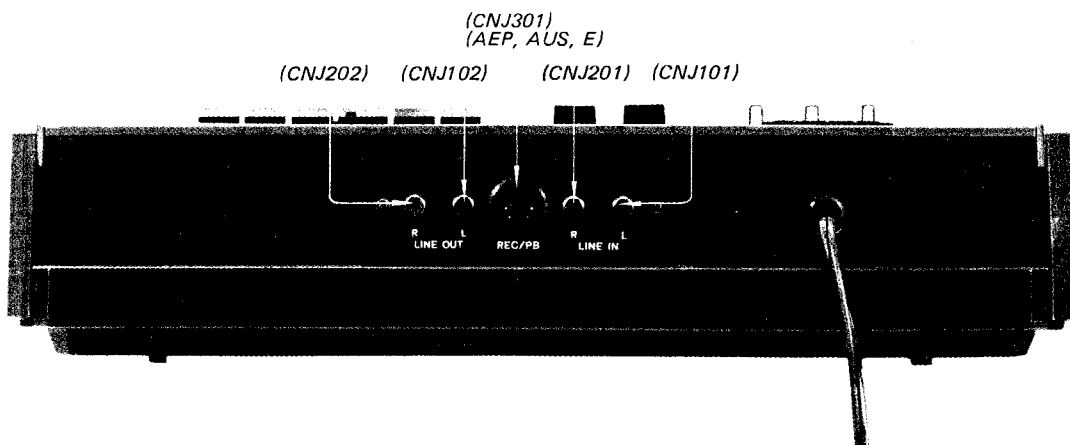
3. Muting Switch (S5) Functions:

When record/playback switch is changed, muting switch grounds HEADPHONE/METER AMP circuit and prevents misoperation of limiter circuit caused by click noise.
(Muting switch is turned ON for a moment to ground click noise when record/playback switch is changed or when each button is depressed.)

1-4. EXTERNAL VIEW (1)



1-5. EXTERNAL VIEW (2)



1-6. INTERNAL VIEW (1)

CNJ301
(AEP, AUS, E)

LINE IN R

LINE OUT L

LINE IN L

LINE OUT R

1-224-193-00
resistor, 20 k Ω (A); variable:
REC VOLUME (R221)
1-224-193-00
resistor, 20 k Ω (A); variable:
REC VOLUME (R121)

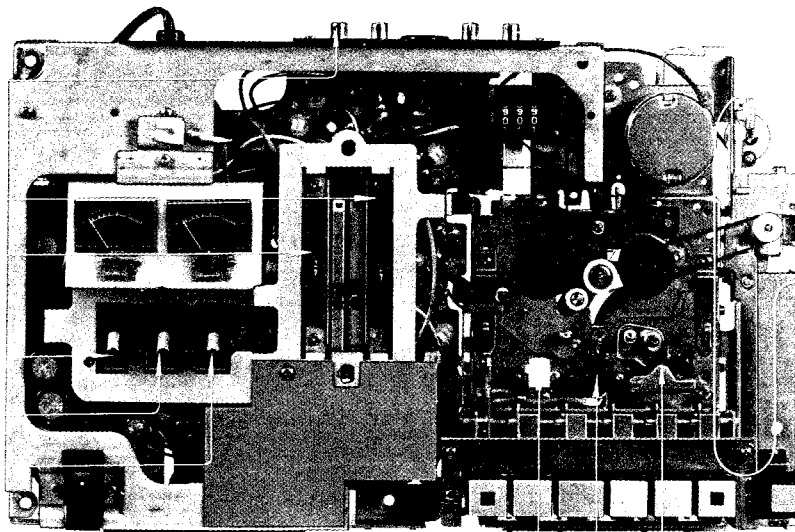
automatic shut-off
mechanism section

1-516-268-00
switch, lever slide: TAPE SELECT
(S4)

1-516-268-00
switch, lever slide: LIMITER (S1)

1-516-268-00
switch, lever slide: DOLBY NR (S2)

8-825-506-00
head, erase (EF 135-36) (EH)



8-825-584-00
head, record/playback
(PF 145-3602A6) (RPH)

X-34893-06-0
pinch roller ass'y

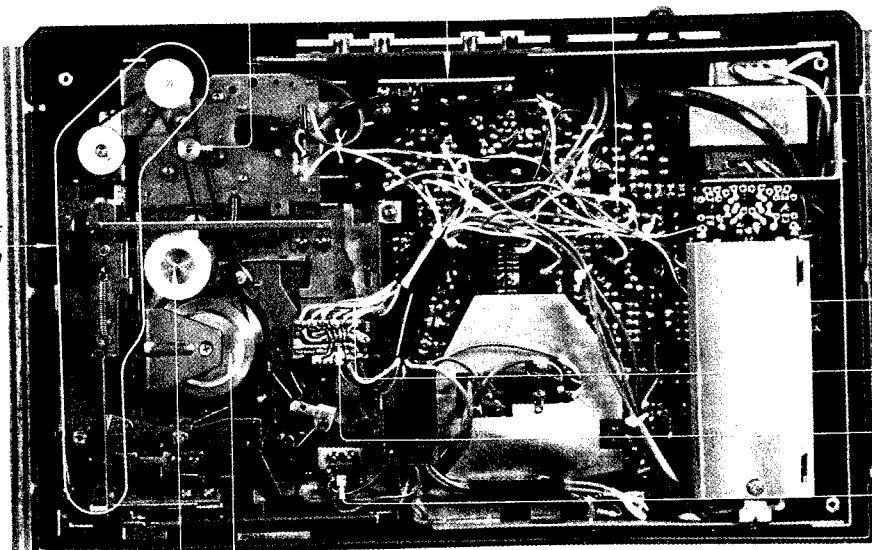
1-7. INTERNAL VIEW (2)

3-533-357-01 (no groove)
3-533-357-11 (one groove)
3-533-357-21 (two grooves)
3-533-357-31 (three grooves)
pulley, motor

1-582-440-00
printed circuit board, jack

X-35333-51-0
complete circuit board, amp

automatic shut-off
mechanism section



1-442-201-00 (E)
1-442-097-00 (USA)
1-442-167-00 (Canada)
1-442-189-11 (AEP, AUS)
transformer, power (T301)

X-35133-52-0
complete circuit board,
DOLBY

1-514-792-00
switch, leaf: motor (S6)

1-513-273-00
switch, slide: timing (S3)

1-514-346-00
switch, leaf: muting (S5)

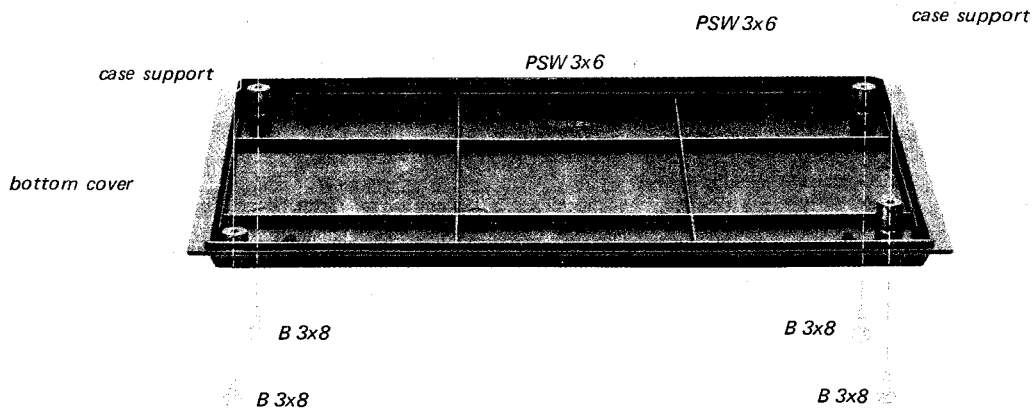
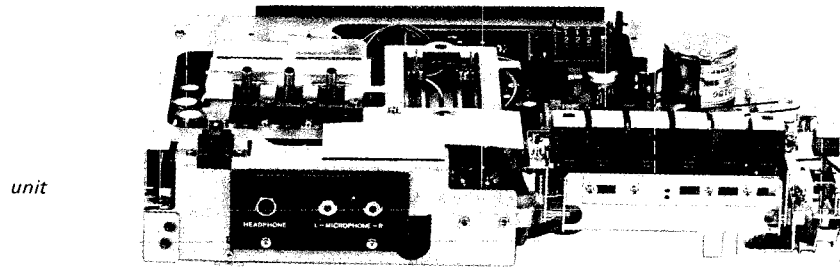
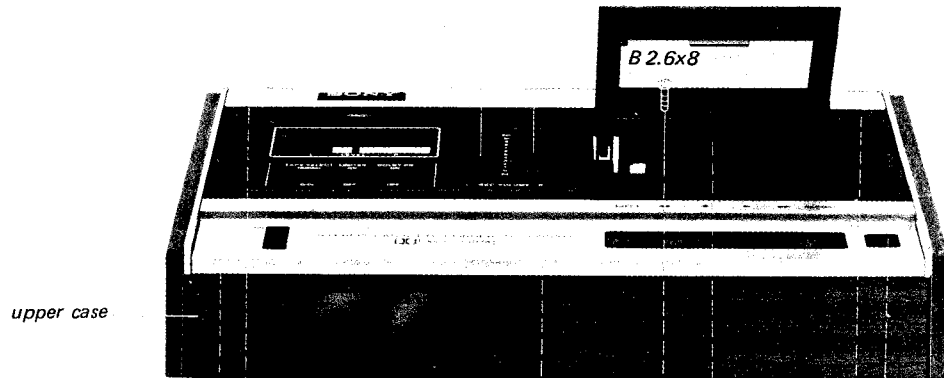
X-34893-07-2
flywheel ass'y

X-34890-08-0
arm ass'y, tension

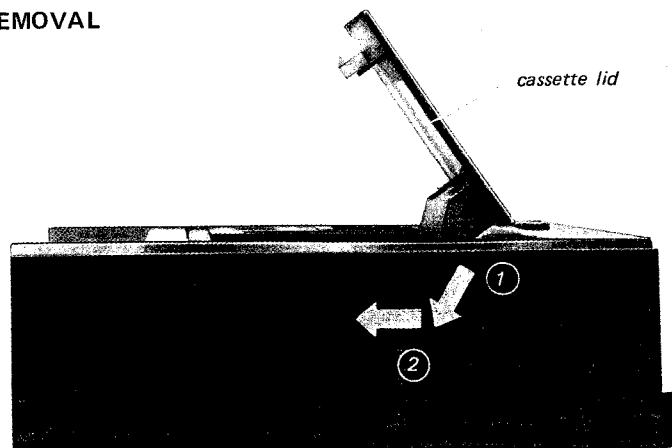
SECTION 2 DISASSEMBLY

2-1. CASE REMOVAL

REC VOLUME knob



2-2. CASSETTE LID REMOVAL

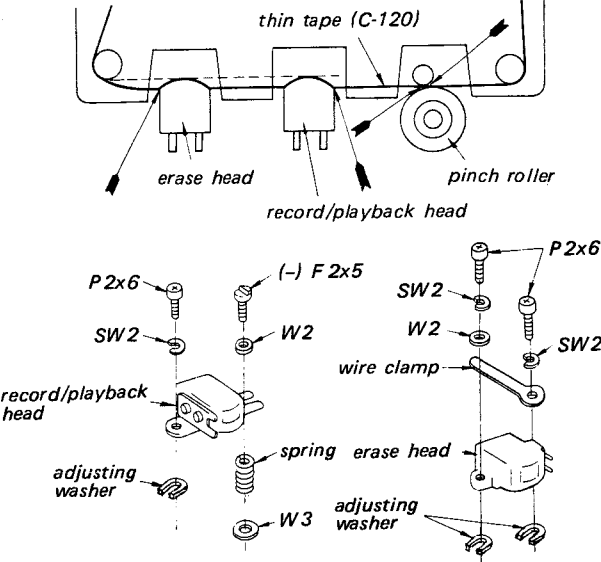


SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

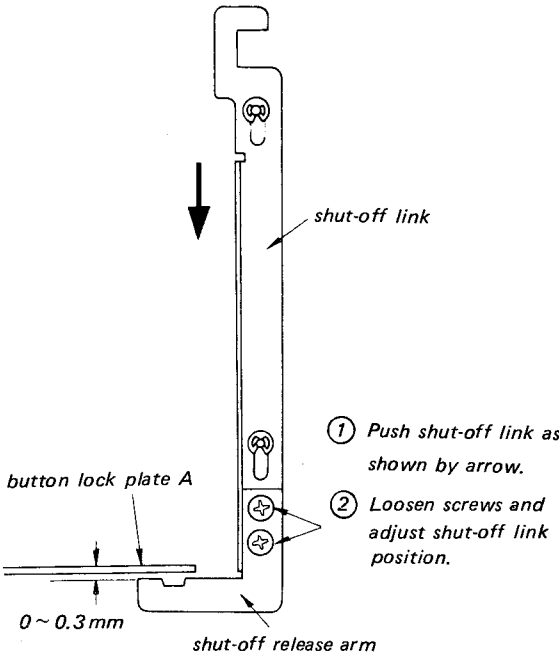
Head Height Adjustment
— playback mode —

Adjust by removing or adding the adjusting washer so that tape straight runs without curl at positions shown by arrows.



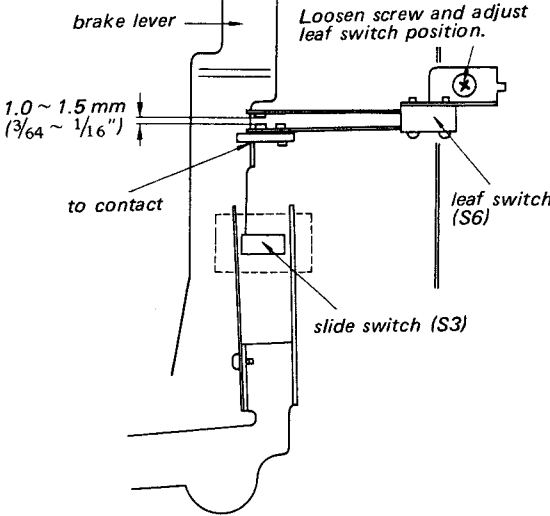
Part. No.	Description
3-513-237-01	adjusting washer (t=0.1)
3-513-237-11	adjusting washer (t=0.2)

Shut-off Release Arm Adjustment
— stop mode —



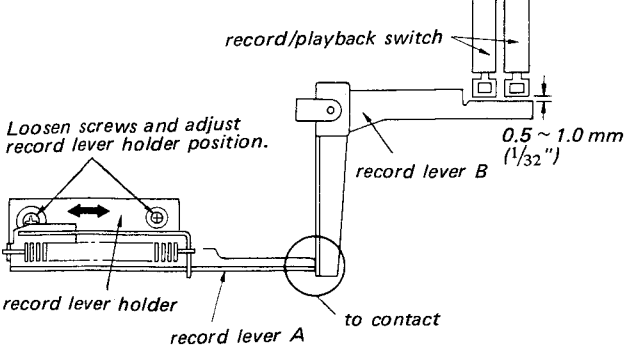
Note: If above adjustment is not correctly made, automatic shut-off mechanism will operate during pause mode.

Motor Leaf Switch (S6) Adjustment
— stop mode —

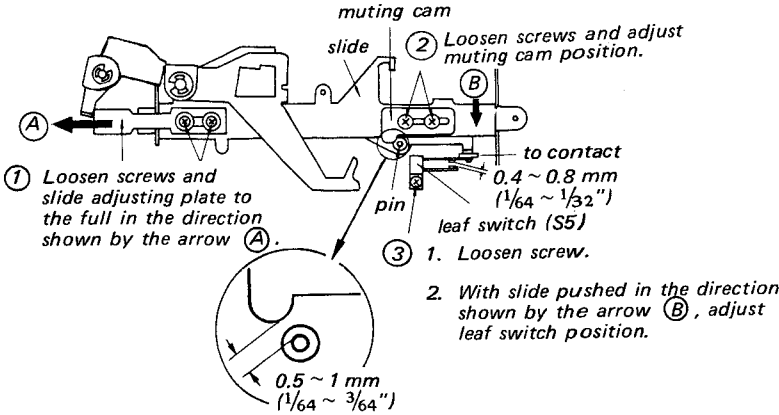


Note: When slowly depressing forward button, ensure that slide switch is changed after leaf switch is closed.

Record Lever Holder Adjustment
— stop mode —

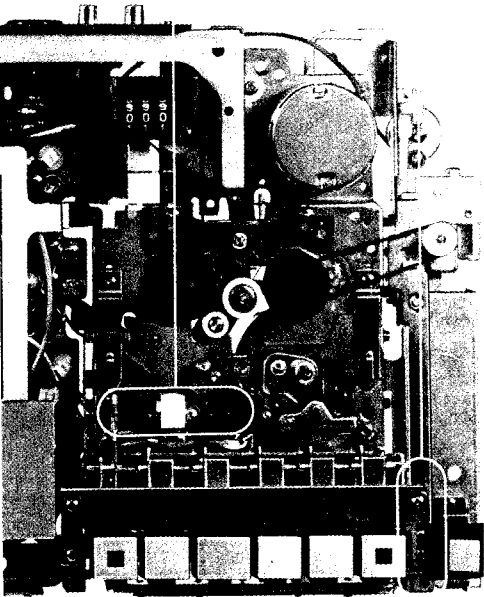


Muting Leaf Switch (S5) Adjustment
— stop mode —
Perform in numerical order .

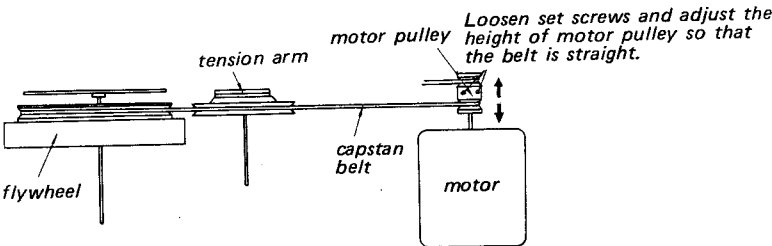


Note: After this adjustment.

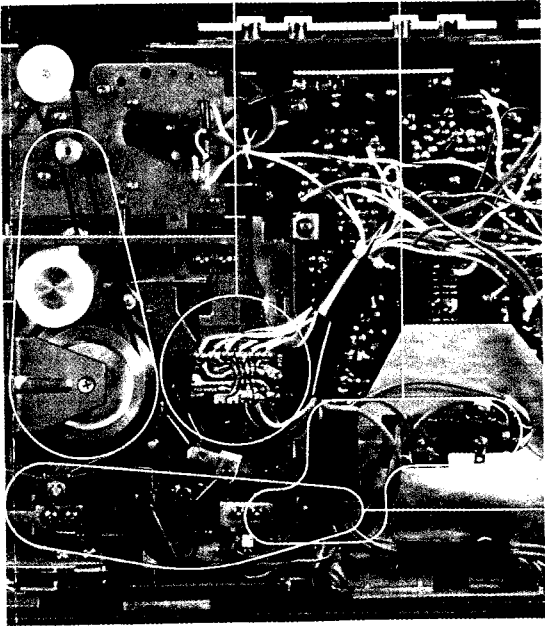
1. When depressing RECORD button without tape cassette, ensure that record/playback switch is not changed.
2. When depressing RECORD button with a tape cassette that has safety tab, ensure that record/playback switch is changed.



Motor Pulley Height Adjustment
— stop mode —



Note: Ensure that capstan belt is installed without twist and dirt.



Checks After Mechanical Adjustments (1)

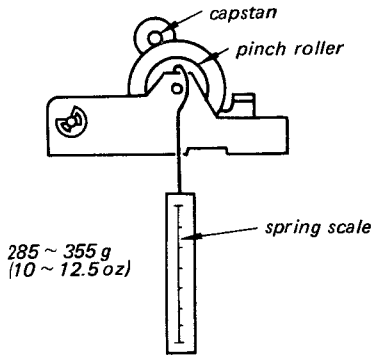
Button Operation Check

Depress	Results
forward button fast forward button rewind button REC button	locked
stop button EJECT button	not locked
PAUSE button	{ first depressinglocked second depressingreleased

Mode	Depress	Results
playback	fast forward button	fast forward mode
	rewind button	rewind mode
	stop button	stop mode
	REC button	not depressed
	EJECT button	playback mode with cassette lid opened
fast forward	forward button	playback mode
	rewind button	rewind mode
	stop button	stop mode
	EJECT button	eject, stop mode
	REC button	not depressed
rewind	forward button	playback mode
	fast forward button	fast forward mode
	stop button	stop mode
	EJECT button	eject, stop mode
	REC button	not depressed
record	fast forward button	fast forward mode
	rewind button	rewind mode
	stop button	stop mode
	EJECT button	record mode with cassette lid opened

Pinch Roller Pressure Measurement

— playback mode —

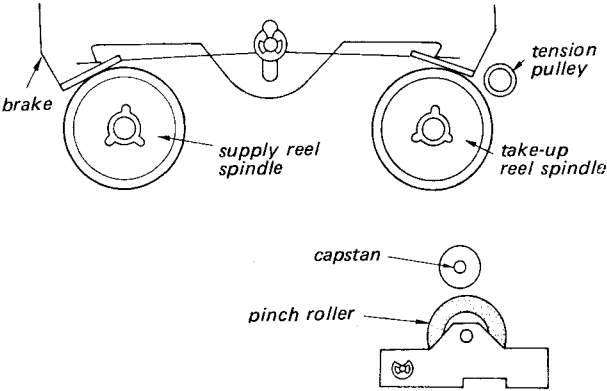


Note: The pressure should be measured just when the pinch roller contacts the capstan after being separated.

Forward Button Timing Check

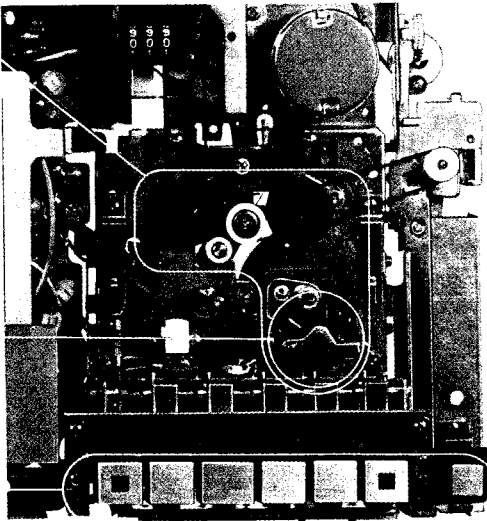
When slowly depressing forward button, ensure that the following functions occur in the numerical order. (or simultaneously.)

1. Brake separates from each reel spindle.
2. Tension pulley contacts take-up reel spindle.
3. Motor switch turns on and capstan starts to rotate.
4. Pinch roller contacts capstan.



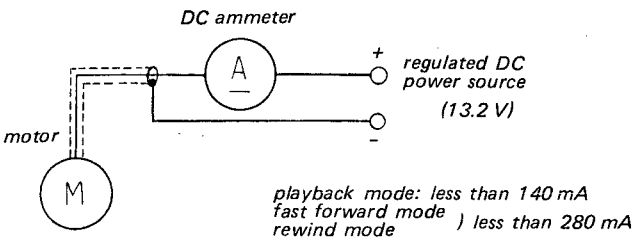
Torque Measurement

Mode	Torque
Playback	40 ~ 60 g · cm (0.56 ~ 0.83 oz · inch)
Fast forward Rewind	70 ~ 150 g · cm (0.84 ~ 2.1 oz · inch)



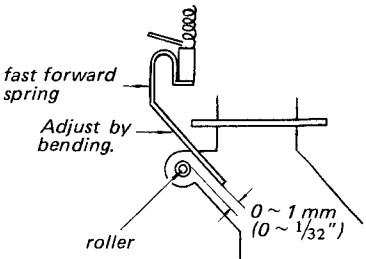
Motor Current Measurement

Measure current as shown.



Fast Forward Spring Check

— stop mode —

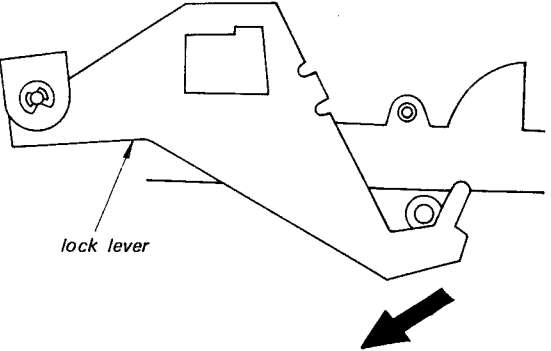


Note: When fast forward and rewind torques are poor, clean idlers and adjust fast forward spring.

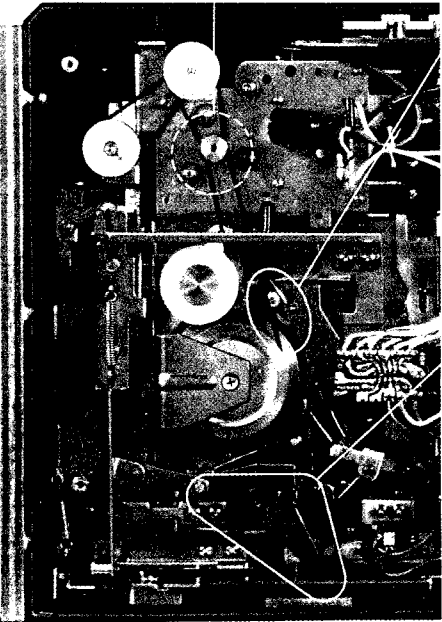
Lock Lever Operation Check

— record mode —

1. With forward button kept depressed, depress stop button.
(REC button is only released and record function is not completely released.)
2. With forward button gradually returned, ensure that lock lever releases in the direction shown by the arrow.



Note: If lock lever does not release, REC button may not be depressed with a cassette loaded.



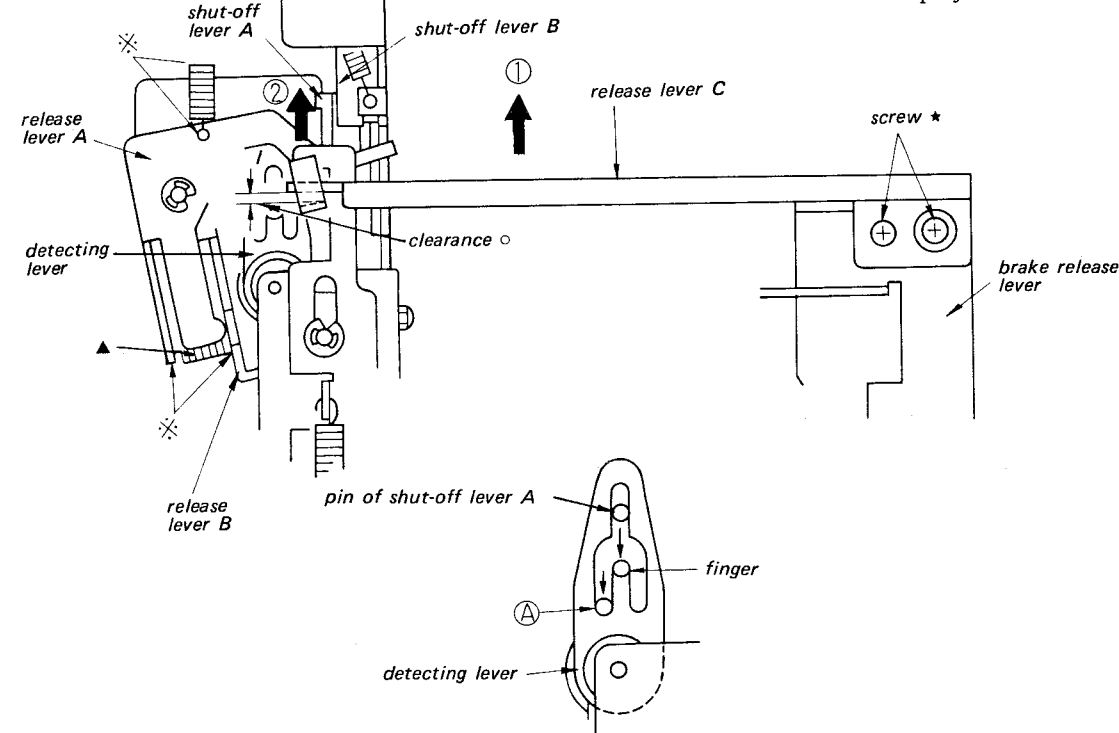
Checks After Mechanical Adjustments (2)

Automatic Shut-off Mechanism Operation Check

Release-Lever-C Operation Check

1. Turn POWER switch OFF and place the unit in stop mode.
2. Pull brake release lever in the direction shown by the arrow ① to obtain the clearance marked ○.
3. Pull shut-off lever A in the direction shown by the arrow ② to interlock shut-off lever B with shut-off lever A.
4. Lift shut-off lever B to stop the pin of shut-off lever A at finger of detecting lever.
5. When returning release lever C, ensure that the pin of shut-off lever A returns to position A.

Note: Release Function Order:
release lever C → release lever A →
release lever B → detecting lever



Do not break marked ✖, apply lock paint there.

If the pin of shut-off lever A does not return to position A in Step 5, automatic shut-off mechanism will operate, as soon as mode changes from stop to playback, fast forward or rewind.

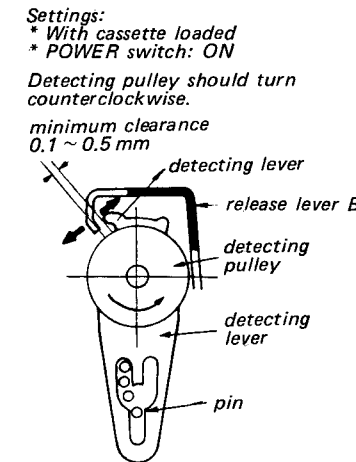
This trouble is caused by the following:

Cause	Remedy
Lengthened spring marked ▲	Replace.
Clearance marked ○	Loosen screws marked ★ and adjust release-lever-C position for no clearance.
Unsmooth return of brake release lever	Make the lever free from being caught by other levers or projections.

Detecting-Lever and Release-Lever-B Operation Check

1. Rewind Mode

Check as shown below:



If necessary, adjust by bending release lever B. (Do not bend the portion of release lever B shown in black.)

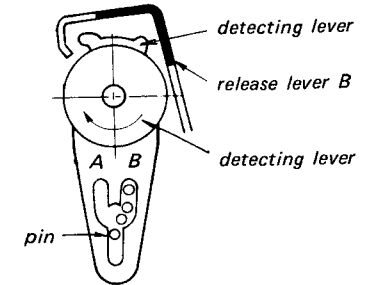
Note: If the above adjustment is not correctly made, automatic shut-off mechanism will operate during rewind mode.

2. Playback and Fast Forward Modes

Check as shown below:

Settings:
★ With cassette loaded
★ POWER switch: ON

Detecting pulley should turn clockwise.

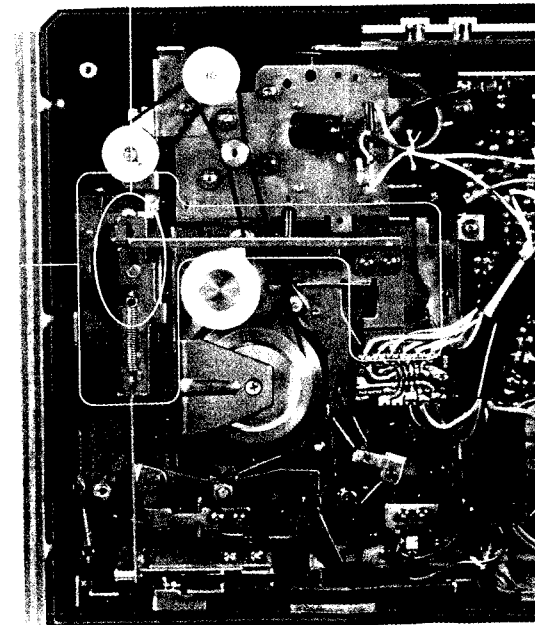


- Ensure that the pin moves along the slot B.

If the pin does not move along the slot B, automatic shut-off mechanism will operate during playback and fast forward modes.

Check the following:

- Friction between detecting pulley and detecting lever should not weak.
- Detecting pulley belt should not slip.



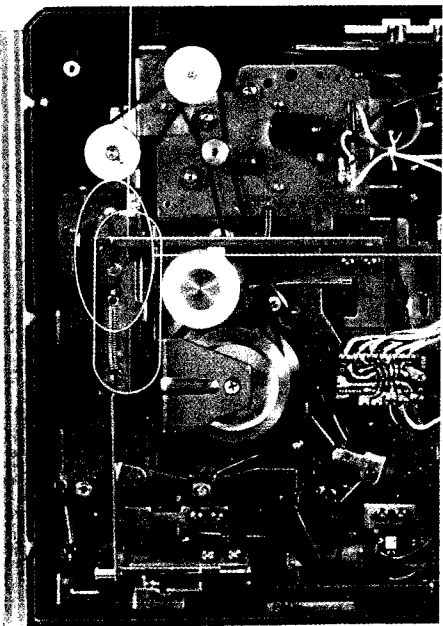
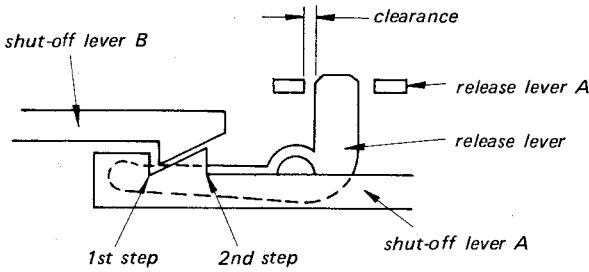
Shut-off Lever-A and Shut-off Lever-B
Operation Check (1)

— playback, fast forward and rewind mode —
(during tape running)

Check the following:

1. Shut-off lever B should completely interlock shut-off lever A at 1st step.
2. The release lever should not push shut-off lever B.
3. There should be a clearance between the release lever and release lever A.

Note: If the above checks are not satisfied, automatic shut-off mechanism will operate during tape running or will not operate even at end of tape. Perform Release-Lever-C Operation Check on Page 15.

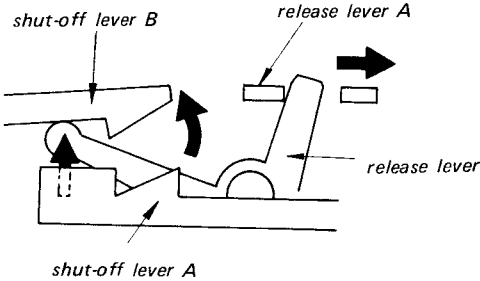


Shut-off Lever-A and Shut-off Lever-B
Operation Check (2)

With stop button or PAUSE button depressed in playback, fast forward and rewind mode, and with automatic shut-off mechanism operated at end of tape.

Check the following:

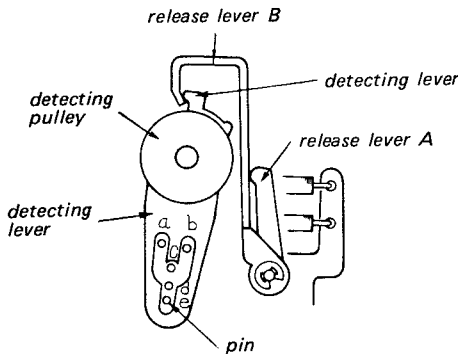
1. Release lever A should push the release lever which pushes shut-off lever B.
2. Shut-off lever B should repeat constant motion not to interlock shut-off lever A.



Release-Lever-B Operation Check.

Check the following:

1. When the pin comes at position "d" or "e" before automatic shut-off operation at end of tape in playback mode, the pin should be stopped at position "b" by depressing PAUSE button.
2. When the pin comes at position "d" in playback, fast forward and rewind modes, the pin should be stopped at position "a" or "b" by depressing stop button.
3. After automatic shut-off mechanism has operated at end of tape in playback, fast forward and rewind modes, the pin should be stopped at position "b".



3-2. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Precaution:

1. Clean the following parts with an alcohol moistened swab:
 - * record/playback head
 - * pinch roller
 - * erase head
 - * rubber belts
 - * capstan
 - * idlers
2. Demagnetize record/playback head with a head demagnetizer.
3. Do not use magnetized screwdriver for adjustments.
4. After adjustments, apply locking paint to the parts adjusted.
5. Adjustments should be performed in the order arranged in this service manual.
6. Adjustments and measurements should be performed for both L-CH and R-CH with rated power supply voltage unless otherwise specified.
7. Record and playback level adjustments should be carefully performed. In case the levels are not as specified, DOLBY circuit will not correctly operate.

Test Equipment/Tools Required:

audio oscillator (af osc)
VTVM
digital frequency counter
oscilloscope
wow meter
1 kHz } bandpass filter
5 kHz }
attenuator (600Ω)
non-magnetic screwdriver
blank tape cassette (completely erased with bulk eraser) C-60 HF
C-60 CR
resistors 100kΩ (¼W), 600 Ω (¼W)
300 Ω (¼W),
SONY test tapes
SPC-4 (1kHz, 0 dB)
WS-48 (3kHz, 0 dB)
P-4-L81 (333 Hz, 0 dB)
P-4-A81 (6.3kHz, -10 dB)
Normal Input Level

	MICROPHONE	LINE IN
impedance	600 Ω	100 kΩ or more
input level	-60 dB (0.77 mV)	-10 dB (0.25 V)

Normal Output Level

	LINE OUT
load impedance	100 kΩ
output level	0 dB (0.775 V)

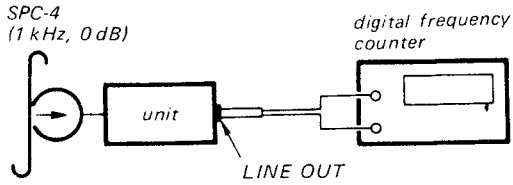
1. Tape Speed Adjustment

Settings:

LIMITER switch: OFF
TAPE SELECT switch: NORMAL
DOLBY NR switch: OFF

Procedure:

1. Mode: Playback



Specification: 985 ~ 1015 Hz
Frequency difference between beginning and end is within 10 Hz.

2. If necessary, change motor pulley.

Part No.	Motor Pulley (groove)	Tape Speed
3-533-357-01		faster
3-533-357-11		↑
3-533-357-21		↓
3-533-357-31		slower

Note: After the motor pulley is changed, perform Motor Pulley Height Adjustment on Page 11.

2. Head Azimuth Adjustment

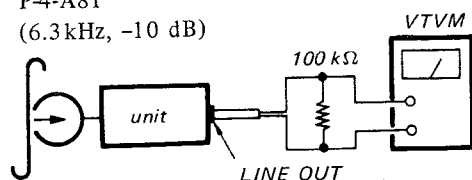
Settings:

LIMITER switch: OFF
TAPE SELECT switch: NORMAL
DOLBY NR switch: OFF

Procedure:

1. Mode: Playback

P-4-A81
(6.3 kHz, -10 dB)

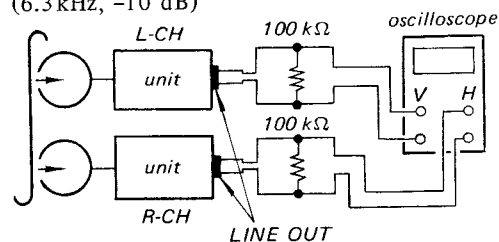


- 2.

Adjust	VTVM reading	Remarks
azimuth adjusting screw	highest peak	If the azimuth angles of L-CH and R-CH are not the same, set the screw midway between two screw positions.

3. Mode: Playback

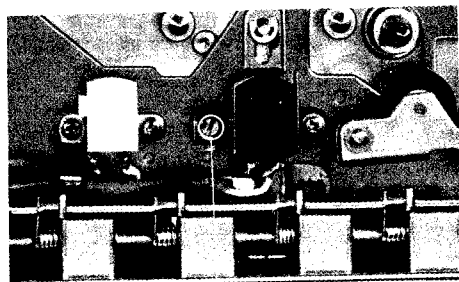
P-4-A81
(6.3 kHz, -10 dB)



- 4.

Adjust	On the oscilloscope
azimuth adjusting screw	<div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>in phase</p> <p>(L) (R)</p> </div> <div style="margin: 0 10px;">~</div> <div style="text-align: center;"> <p>90°</p> <p>(L) (R)</p> </div> </div>

Adjustment Location:



azimuth adjusting screw

3. Playback Level Adjustment

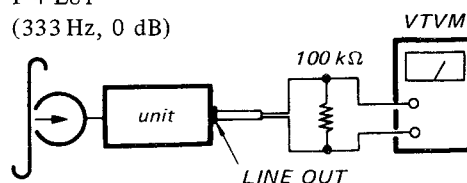
Settings:

LIMITER switch: OFF
TAPE SELECT switch: NORMAL
DOLBY NR switch: OFF

Procedure:

1. Mode: Playback

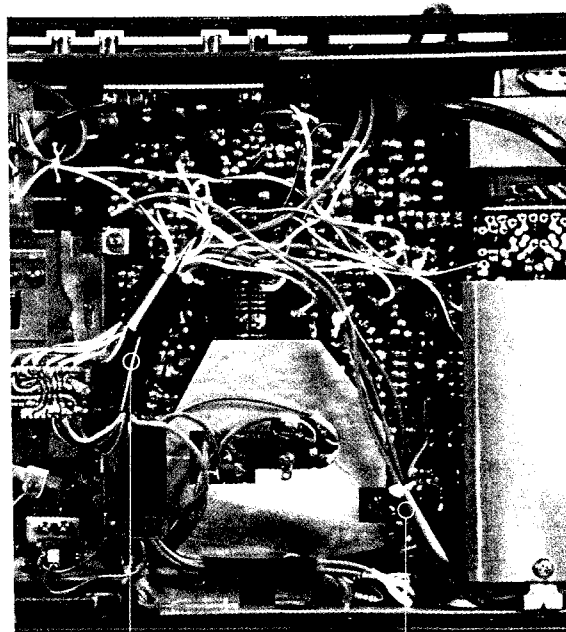
P-4-L81
(333 Hz, 0 dB)



- 2.

Adjust	VTVM reading	Remarks
R115 R215	0 dB (0.775 V)	<ol style="list-style-type: none"> 1. Allowance: within ± 0.5 dB 2. Level difference between the L-CH and R-CH should be within 1 dB.

Adjustment Location:



R215
(R-CH)

R115
(L-CH)

4. Playback Equalizer Adjustment

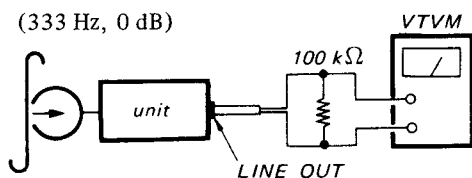
Settings:

LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF

Procedure:

1. Mode: Playback

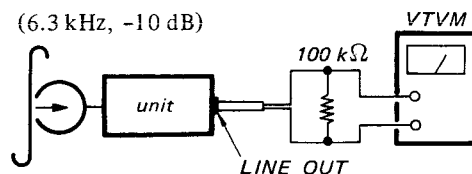
P-4-L81
 (333 Hz, 0 dB)



Memorize the VTVM reading.

2. Mode: Playback

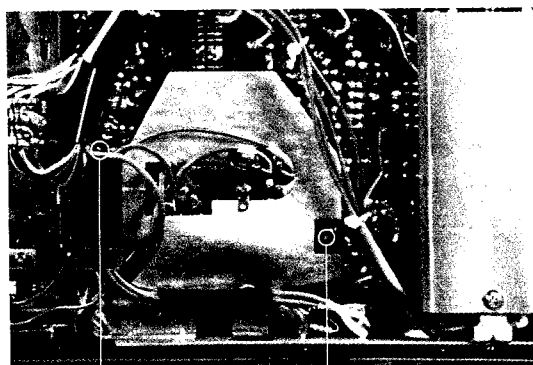
P-4-A81
 (6.3 kHz, -10 dB)



Adjust	VTVM reading	Remarks
R114 (L-CH) R214 (R-CH)	Level in Step 2 are lower by 10 dB than level in Step 1.	Allowance: within ± 1 dB

Note: When adjustable resistors R114 and R214 are much turned, perform playback level adjustment on Page 19.

Adjustment Location:



R214
(R-CH)

R114
(L-CH)

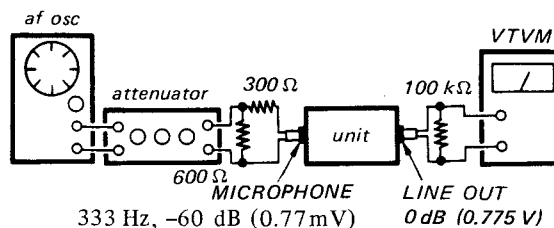
5. LEVEL Meter Calibration

Settings:

LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

1. Mode: Record

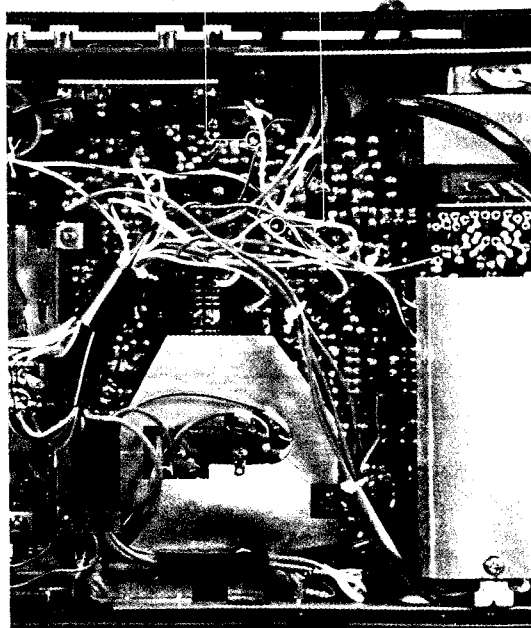


2.

Adjust	LEVEL meter reading
R159 (L-CH) R259 (R-CH)	-20 0 +3

Adjustment Location:

R259 (R-CH) R159 (L-CH)



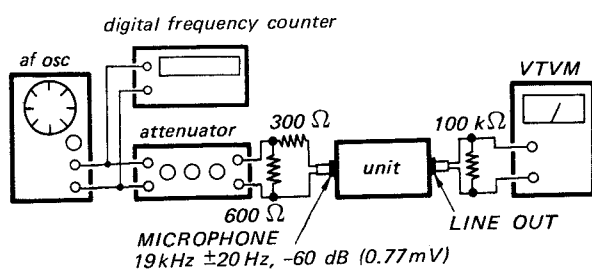
6. 19 kHz Filter Adjustment

Settings:

LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

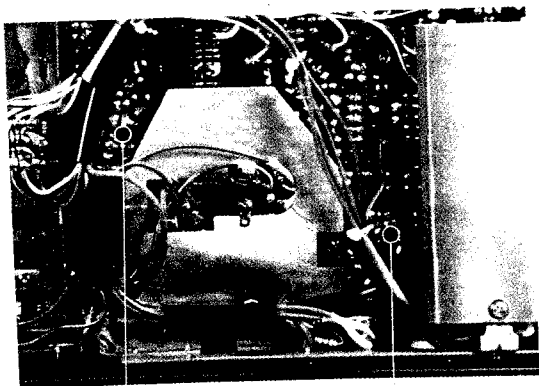
1. Mode: Record



Note: 19 kHz pilot signal of stereo signal generator may be used for input signal.

Adjust	VTVM reading	Remarks
L102 (L-CH)	minimum (less than -28 dB, 31 mV)	Frequency Allowance: within ± 20 Hz.
L202 (R-CH)		

Adjustment Location:



L202 (R-CH)

L102 (L-CH)

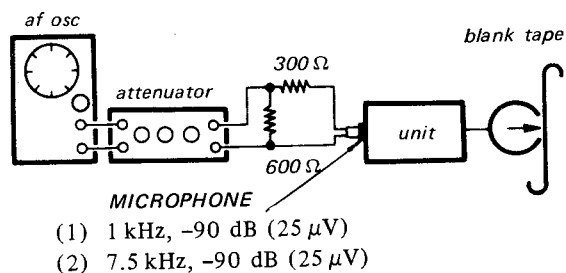
7. Record Bias Adjustment

Settings:

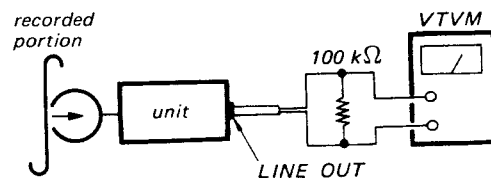
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

1. Mode: Record



2. Mode: Playback



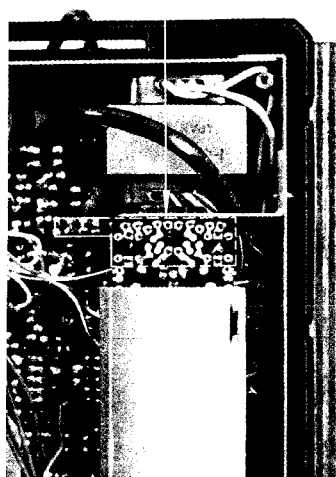
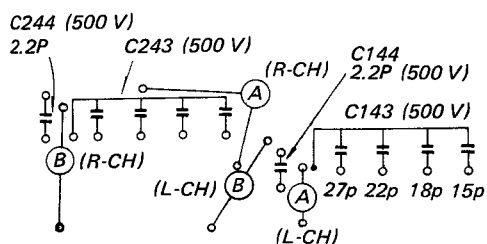
Adjust	VTVM reading
C143 (L-CH)	1 kHz level = 7.5 kHz level Allowance: within ± 0.5 dB
C243 (R-CH)	
C144 (L-CH)	
C244 (R-CH)	

Level	Capacitance Value
7.5 kHz > 1 kHz	increase
7.5 kHz < 1 kHz	decrease

Adjust by soldering and repeat steps 1 and 2.

— Continued on next page —

Adjustment Location:



If the specified results are not obtained, connect additional capacitor:

Level	Adjust
7.5 kHz > 1 kHz	Connect capacitor 56pF at (A) position and repeat Steps 1 to 2.
7.5 kHz < 1 kHz	Connect capacitor 56pF at (B) position and repeat Steps 1 to 2.

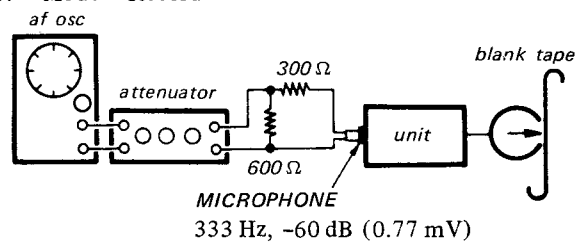
8. Record Level Adjustment

Settings:

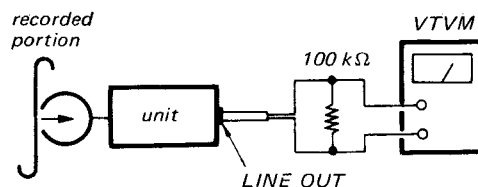
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

1. Mode: Record



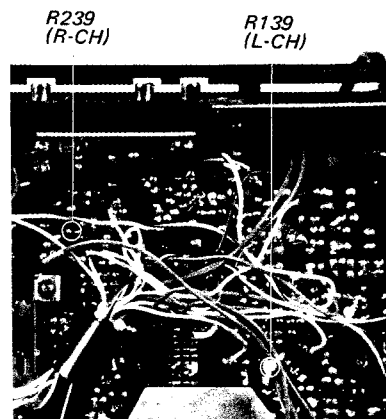
2. Mode: Playback



Adjust	VTVM reading	Remarks
R139 (L-CH) R239 (R-CH)	0 dB (0.775 V)	Allowance: within ± 0.5 dB

Adjust R139 and R239 and repeat steps 1 and 2.

Adjustment Location:



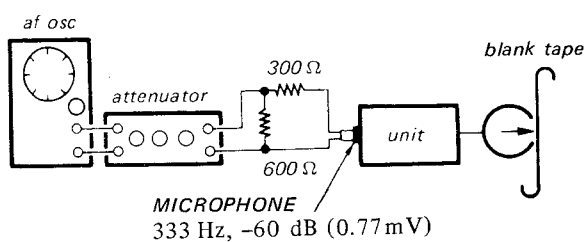
9. Overall Signal-to-Noise Ratio Measurement

Settings:

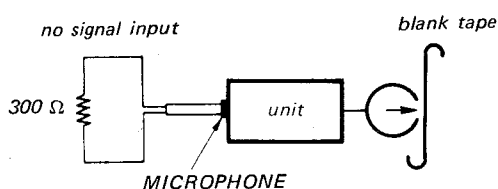
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 REC VOLUME control: for 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

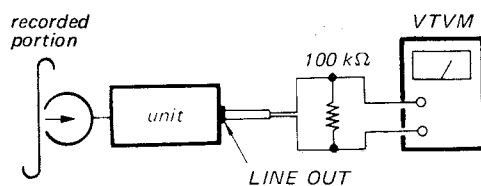
1. Mode: Record



2. Mode: Record



3. Mode: Playback



Playback	VTVM reading
333 Hz	level difference: greater than 44 dB
no signal	

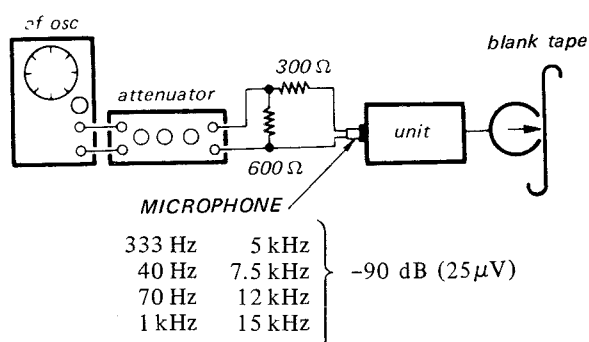
10. Overall Frequency Response Measurement

Settings:

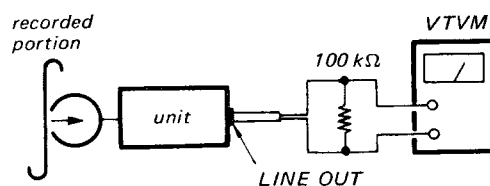
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

1. Mode: Record



2. Mode: Playback



Playback	Output level difference from 333 Hz level		
	DOLBY NR switch: ON	DOLBY NR switch: OFF	
	TAPE: C-60 HF C-60CR	TAPE: C-60 CR TAPE SELECT switch: CrO ₂	TAPE: C-60 HF
333 Hz	0 dB	0 dB	0 dB
40 Hz	—	± ₁₃ ³ dB	± ₁₃ ³ dB
70 Hz	±3 dB	±3 dB	±3 dB
1 kHz	±4 dB	—	—
5 kHz	±4 dB	±3 dB	±3 dB
7.5 kHz	±4 dB	±3 dB	±3 dB
12 kHz	—	—	± ₁₃ ³ dB
15 kHz	—	± ₁₃ ³ dB	—

— : not specified

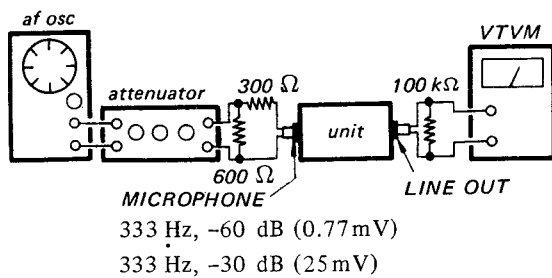
11. LIMITER Response Measurement

Settings:

LIMITER switch: ON
 TAPE SELECT switch: NORMAL
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

1. Mode: Record



Input signal	VTVM reading
333 Hz, -60 dB (0.77 mV)	-0.5 dB (0.73 V) ± 1 dB
333 Hz, -30 dB (25 mV)	+4 dB (1.2 V) ± 1.5 dB

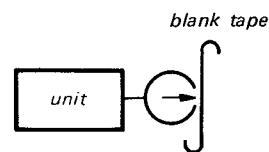
12. DOLBY System Signal-to-Noise Ratio Improvement Measurement

Settings:

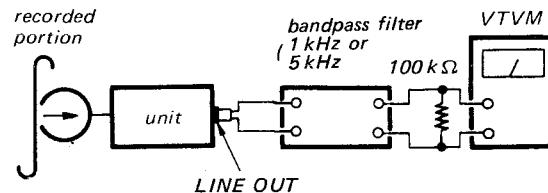
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 REC VOLUME control: MIN
 DOLBY NR switch: OFF

Procedure:

1. Mode: Record
no signal input



2. Mode: Playback



3. With DOLBY NR switch set to ON position, perform Steps 1 and 2.
4. Ensure that DOLBY system improves S/N ratio. S/N ratio should be improved.
 4 dB or more at 1 kHz
 8 dB or more at 5 kHz

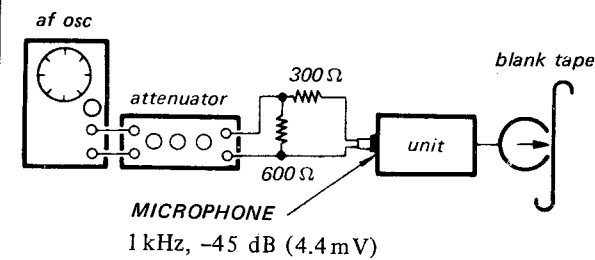
13. Erase Ratio Measurement

Settings:

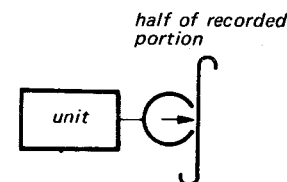
LIMITER switch: OFF
 TAPE SELECT switch: CrO₂
 DOLBY NR switch: OFF
 REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.
 blank tape: C-60 CR

Procedure:

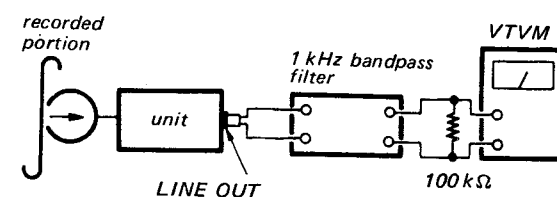
1. Mode: Record



2. Rewind half of recorded portion.
3. Set the REC VOLUME control to MIN position.
4. Mode: Record
no signal input (erase)



5. Mode: Playback



Playback	VTVM reading
1 kHz	level difference: greater than 60 dB
erased portion	

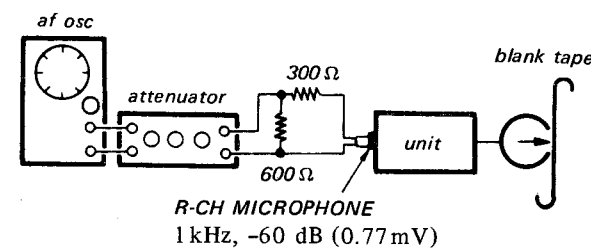
14. Cross-talk Measurement (between channels)

Settings:

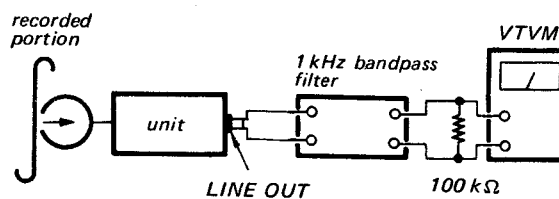
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 R-CH REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

1. Set L-CH REC VOLUME control to the same as R-CH REC VOLUME control position.
2. Terminate L-CH MIC jack with 300 ohm resistor.
3. Mode: Record



4. Mode: Playback



Play back	VTVM reading
R-CH (1 kHz)	level difference:
L-CH (no signal)	greater than 25 dB

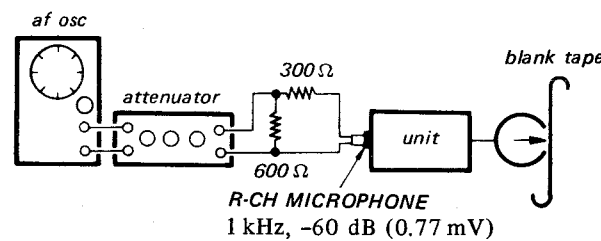
15. Cross-talk Measurement (between tracks)

Settings:

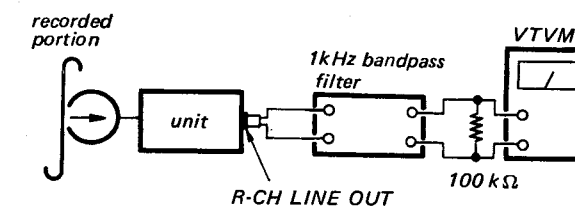
LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF
 R-CH REC VOLUME control: For 0 dB (0.775 V)
 LINE OUT level with
 333 Hz, -60 dB (0.77 mV)
 MICROPHONE signal
 in record mode.

Procedure:

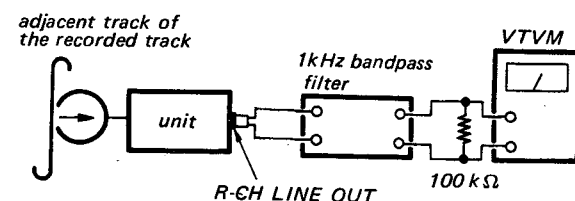
1. Set L-CH REC VOLUME control to the same as R-CH REC VOLUME control position.
2. Terminate L-CH MIC jack with 300 ohm resistor.
3. Mode: Record



4. Mode: Playback



5. Turn the cassette over.
6. Mode: Playback



Playback	VTVM reading
1 kHz	level difference:
adjacent track of the recorded track	greater than 60 dB

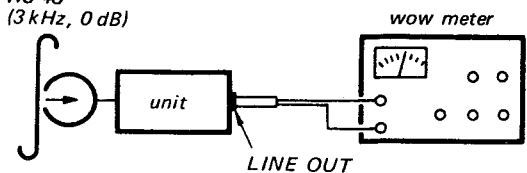
16. Wow and Flutter Measurement

Settings:

LIMITER switch: OFF
 TAPE SELECT switch: NORMAL
 DOLBY NR switch: OFF

Procedure:

WS-48
 (3 kHz, 0 dB)



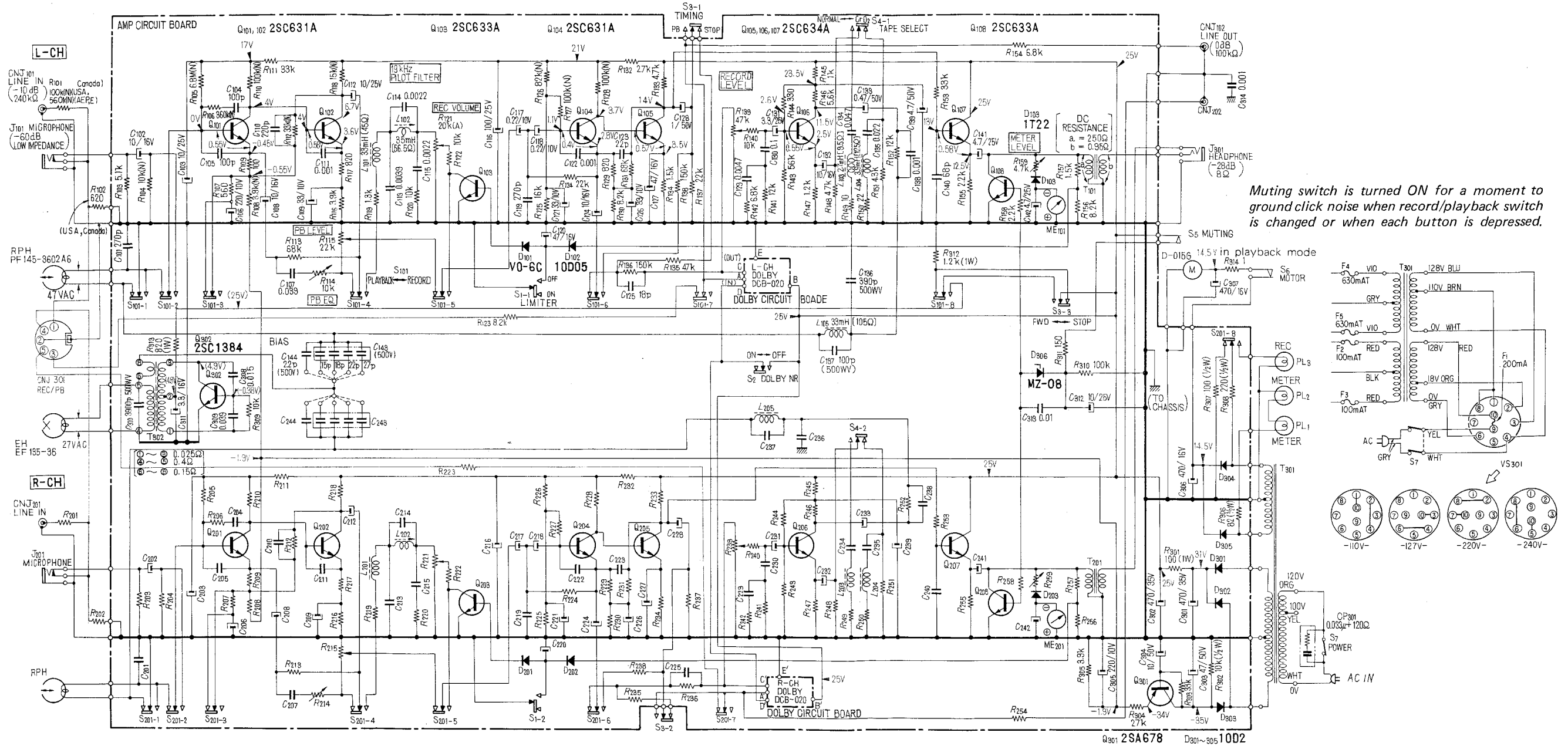
Specification: 0.25 % (RMS) weighted

Note: Measure wow and flutter for beginning and end portion of tape (WS-48).

SECTION 4
DIAGRAMS

4-1. SCHEMATIC DIAGRAM

Amp Circuit



Red Line Circuit: AEP, E, AUS

Note:

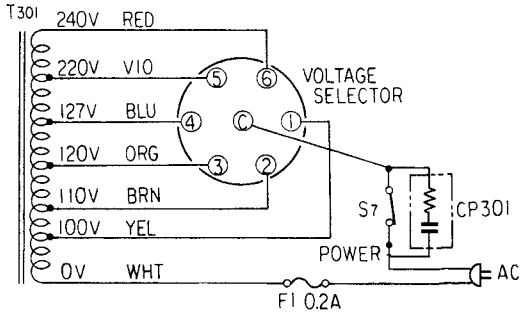
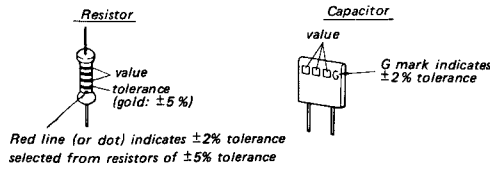
- All resistors and capacitors are in Ω and μF unless otherwise specified.
- Letter in () suffixed to variable resistor value indicates characteristics.
- : chassis ground
- Components for R-CH have the same values as for L-CH.
- (N): Low noise resistor
- Voltage values shown are measured with a voltmeter (20k Ω/V). Variations may be noted due to normal production tolerances.
- no mark : stop mode
- () : record mode
- AC voltage values across heads are measured with a VTVM in record mode.

• Switch mode:

Ref. No.	Switch	Mode
S101, 201	record/playback	playback
S1	LIMITER	ON
S2	DOLBY NR	ON
S3	timing	STOP
S4	TAPE SELECT	CrO ₂
S5	muting	OFF
S6	motor	OFF
S7	POWER	ON

- When replacing resistors and capacitors needing $\pm 2\%$ tolerance, use only those with red line (or dot) or G mark, as DOLBY system requires precise circuit operation.

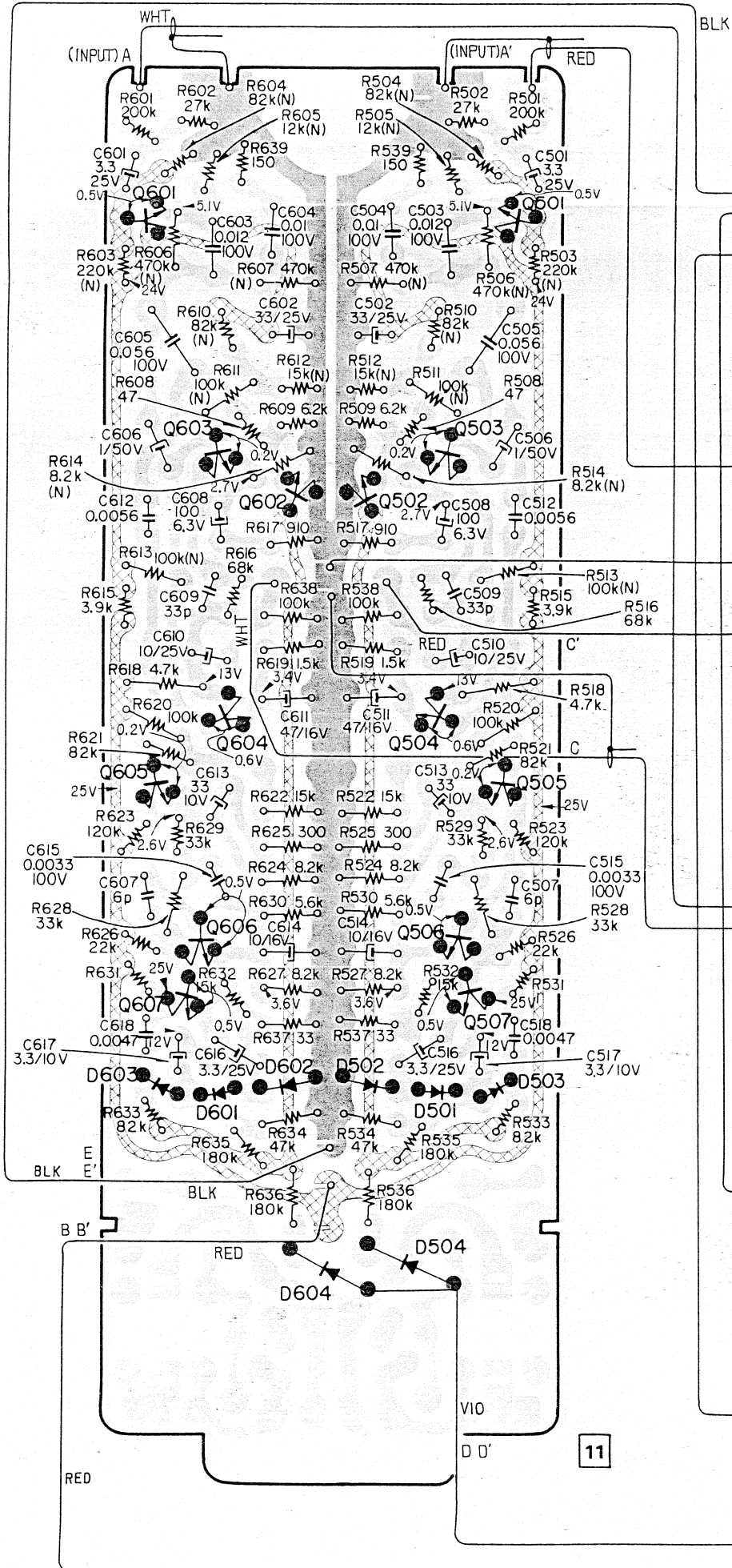
2% Tolerance Identification



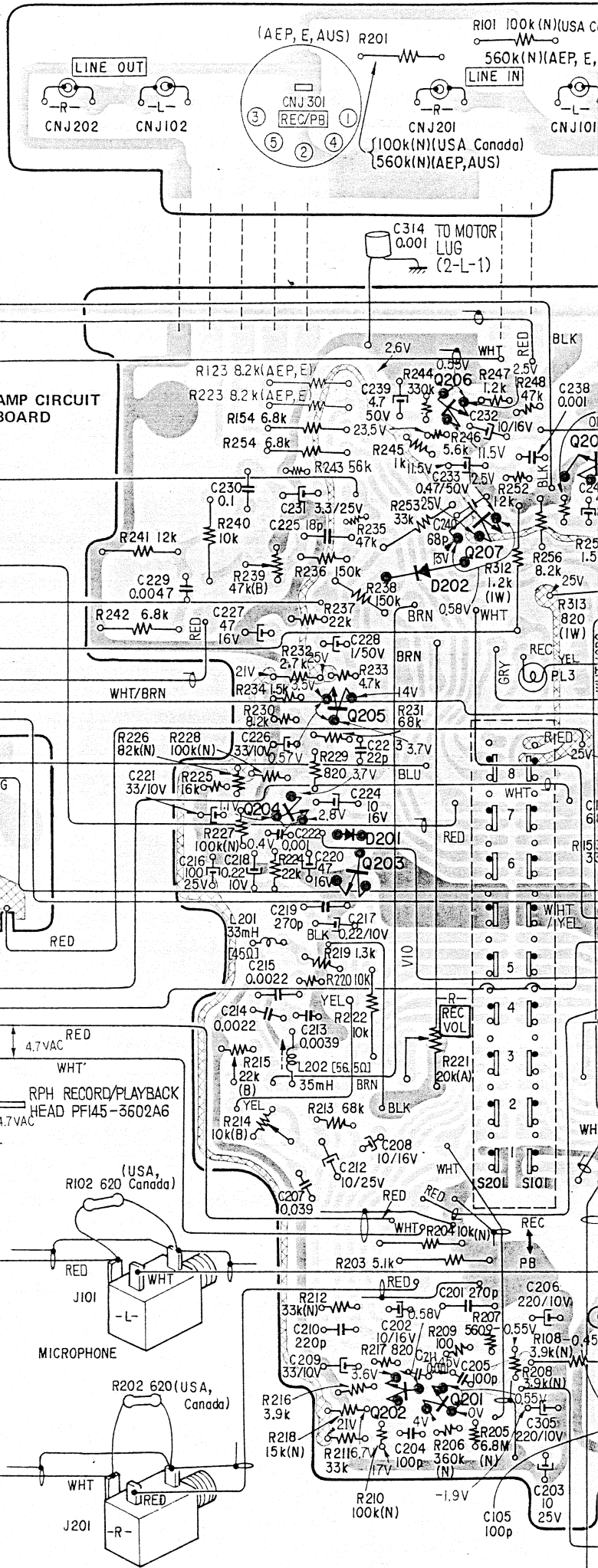
4-2. MOUNTING DIAGRAMS

— Conductor Side —

DOLBY CIRCUIT BOARD
DCB-020



JACK CIRCUIT BOARD
(Component Side)

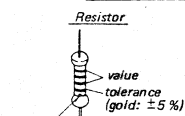


• Switch mode:

Ref. No.	Switch	Mode
S101, 201	record/playback	playback
S1	LIMITER	ON
S2	DOLBY NR	ON
S3	timing	STOP
S4	TAPE SELECT	CrO ₂
S5	muting	OFF
S6	motor	OFF
S7	POWER	ON

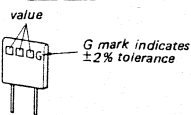
• When replacing resistors and capacitors needing $\pm 2\%$ tolerance, use only those with red line (or dot) or G mark, as DOLBY system requires precise circuit operation.

2% Tolerance Identification



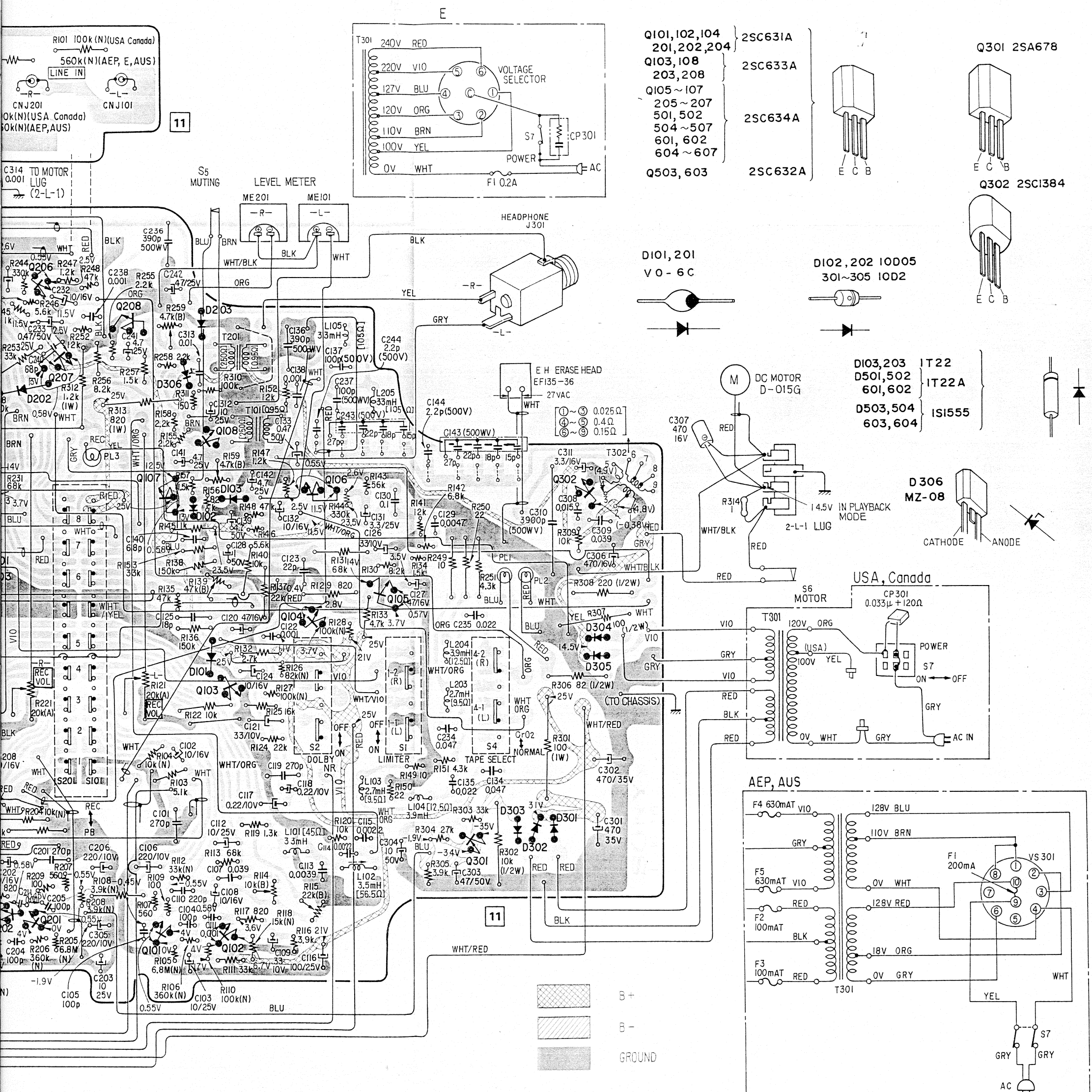
Red line (or dot) indicates $\pm 2\%$ tolerance selected from resistors of $\pm 5\%$ tolerance

Capacitor



Q	204	205	203	206	202	201	207	208
D								
ADJ								

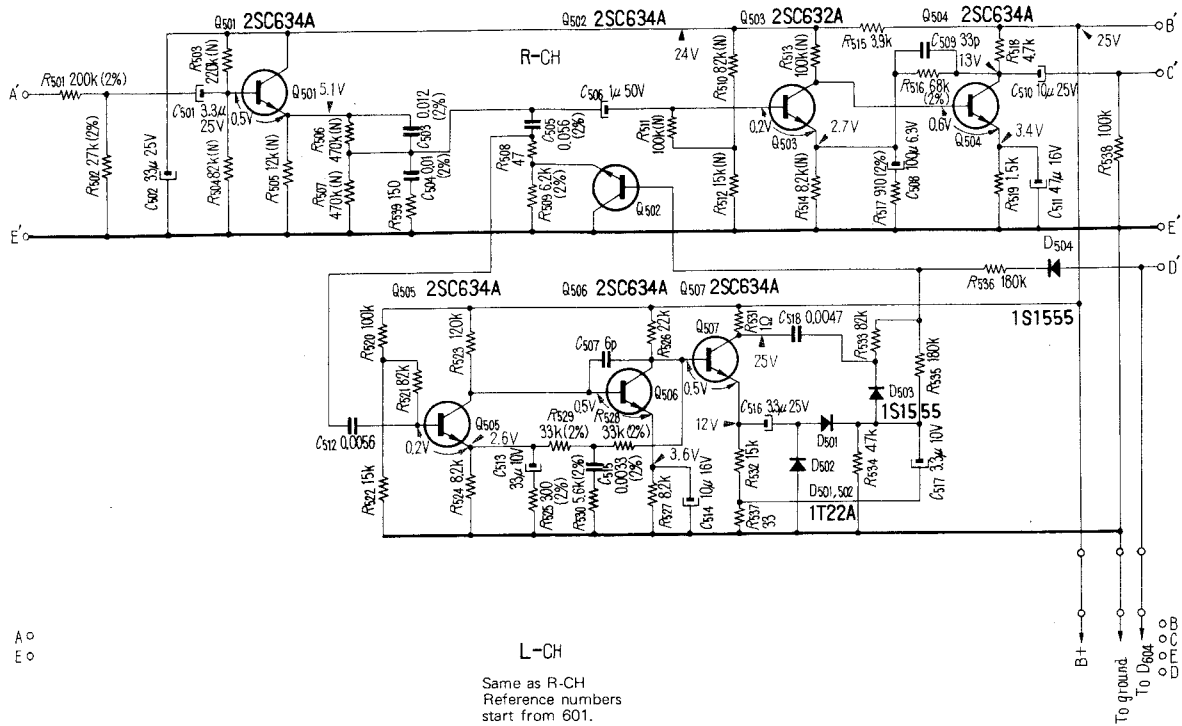
R239, L202
R215, R214



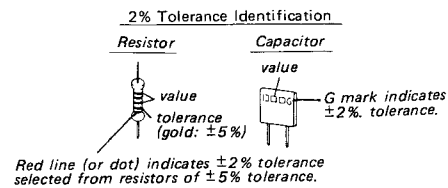
3	206	103	106	301	302
202	201	207	208	101, 107	108, 102
			306, 203		304
			102, 101, 103		303, 302, 301
					305
R221	R121	R259	R159	R114	C244, 243
			R139	R115	L102
					C144, 143

4-3. SCHEMATIC DIAGRAM

DOLBY Circuit

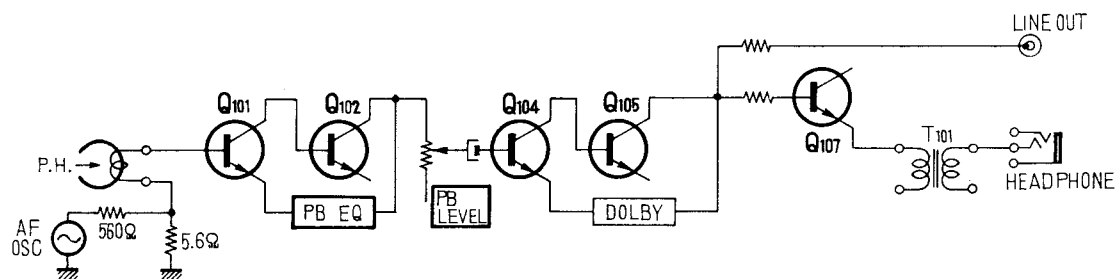
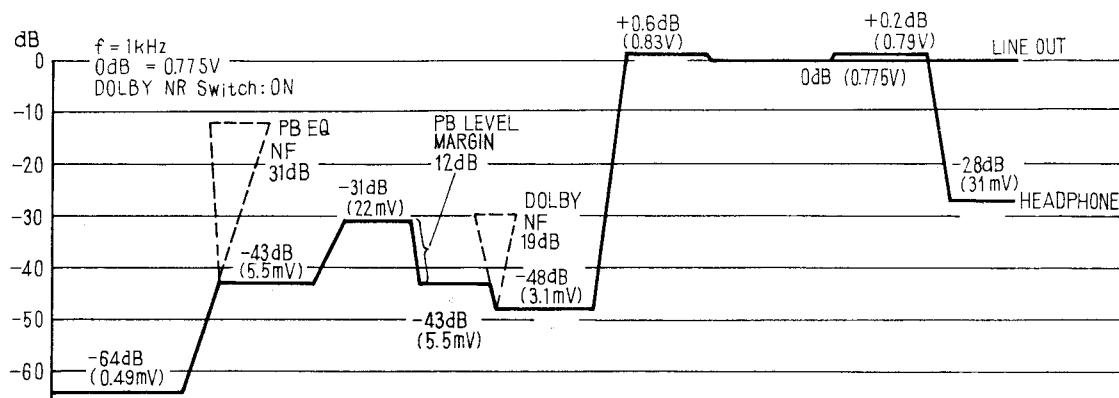


- Note:**
1. All resistors and capacitors are rated in Ω and μF unless otherwise indicated.
 2. The letter (N) which is suffixed to rating values shows a low noise resistor.
 3. Voltage values shown are measured with a voltmeter ($20\text{ k}\Omega/\text{V}$) in playback mode. Variations may be noted because of normal production tolerances.
 4. Components for R-CH are the same value as for L-CH.
 5. When replacing resistors and capacitors needing $\pm 2\%$ tolerance, use only those with red line (or dot) or G mark, as DOLBY system requires precise circuit operation.

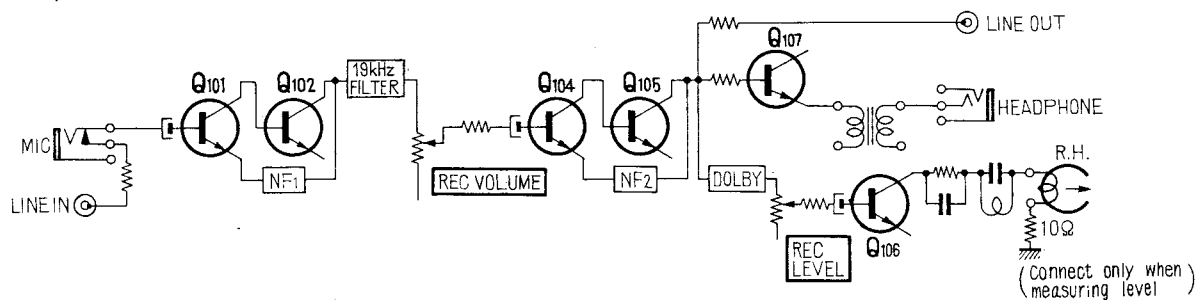
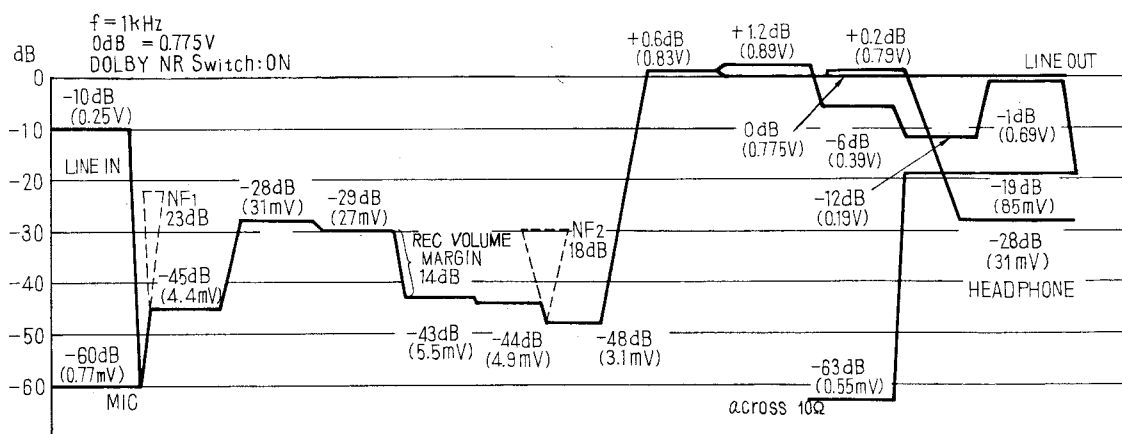


4.4. LEVEL DIAGRAMS

Playback

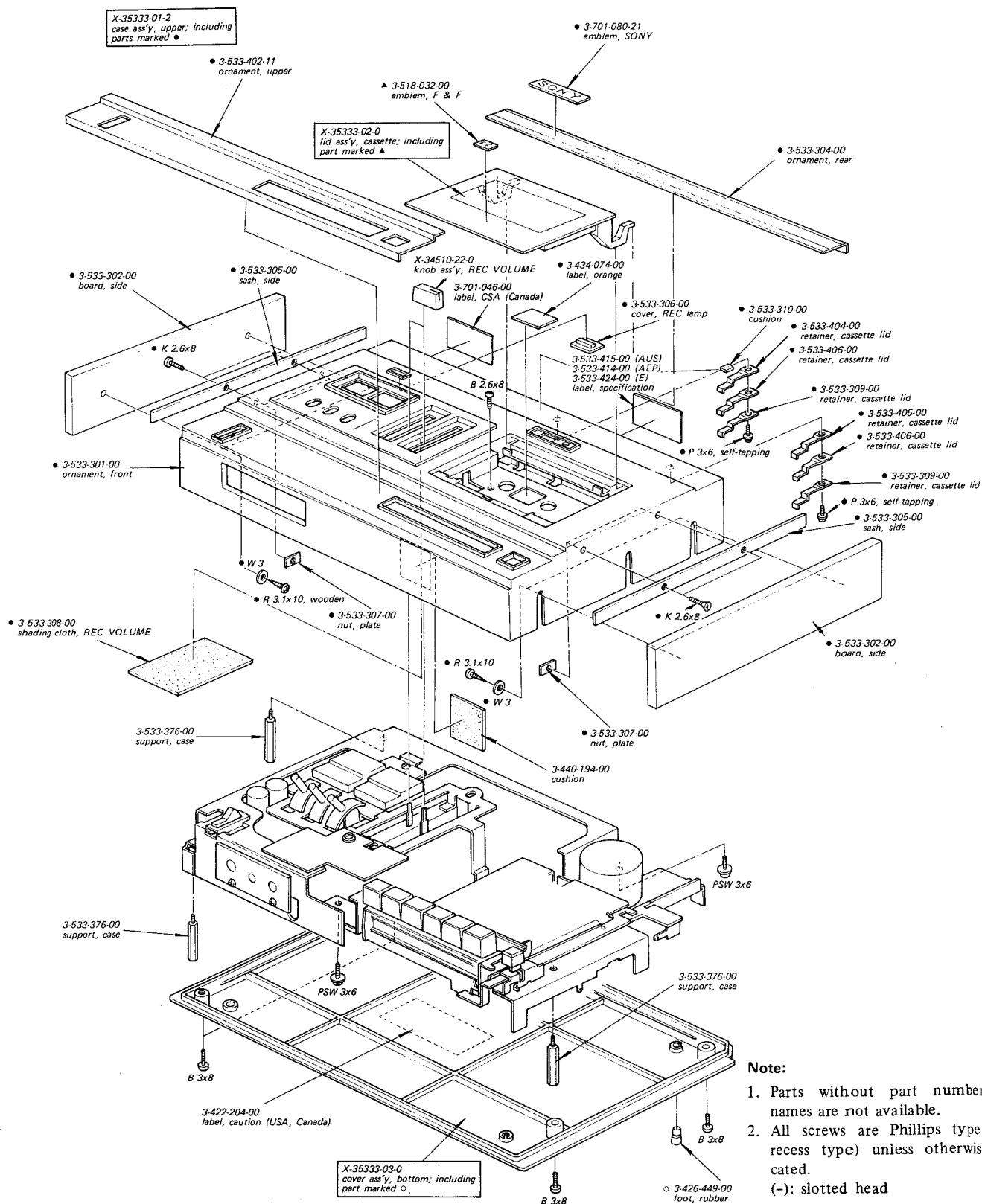


Record



SECTION 5 EXPLODED VIEWS AND PACKING

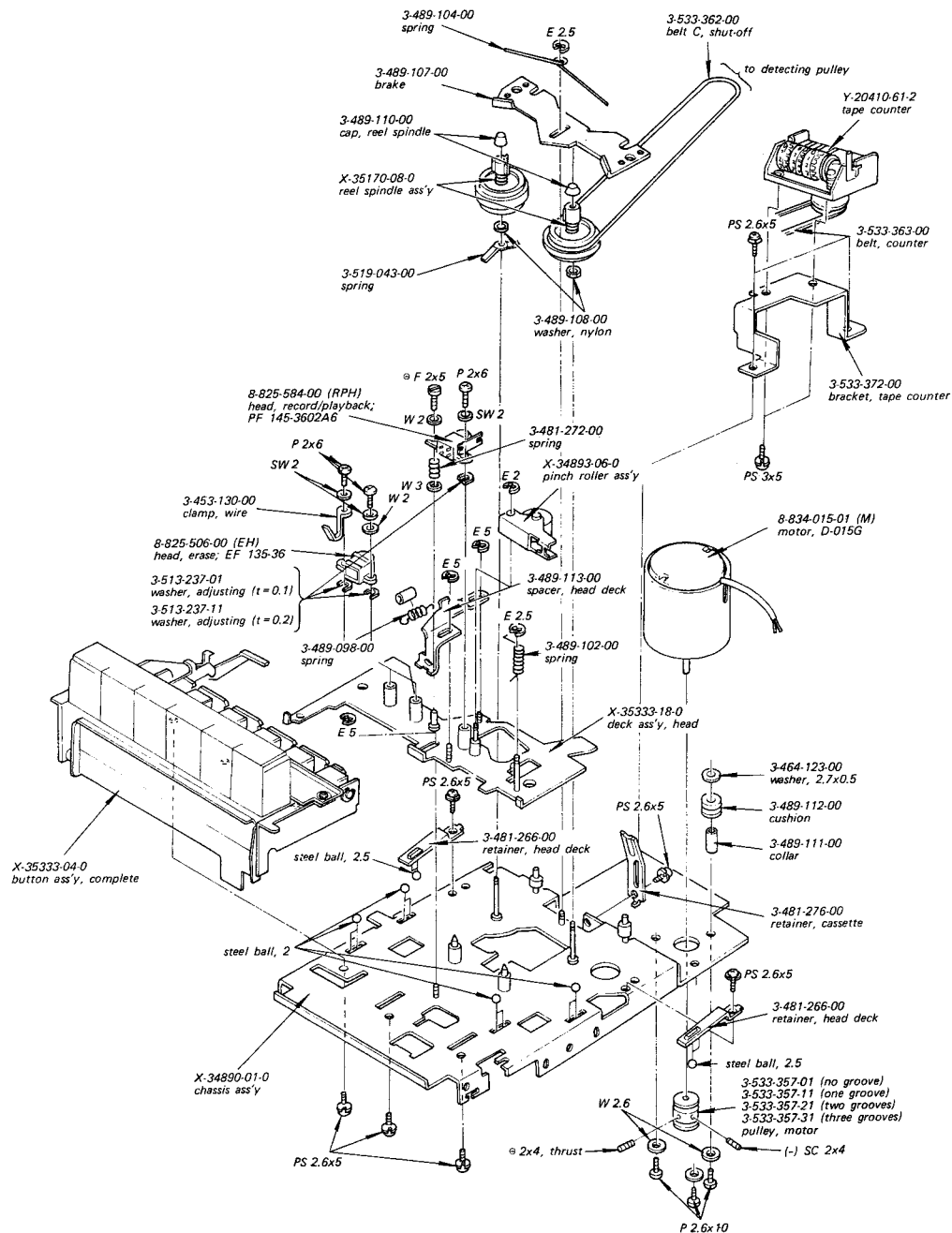
5-1. EXPLODED VIEW (1)



Note:

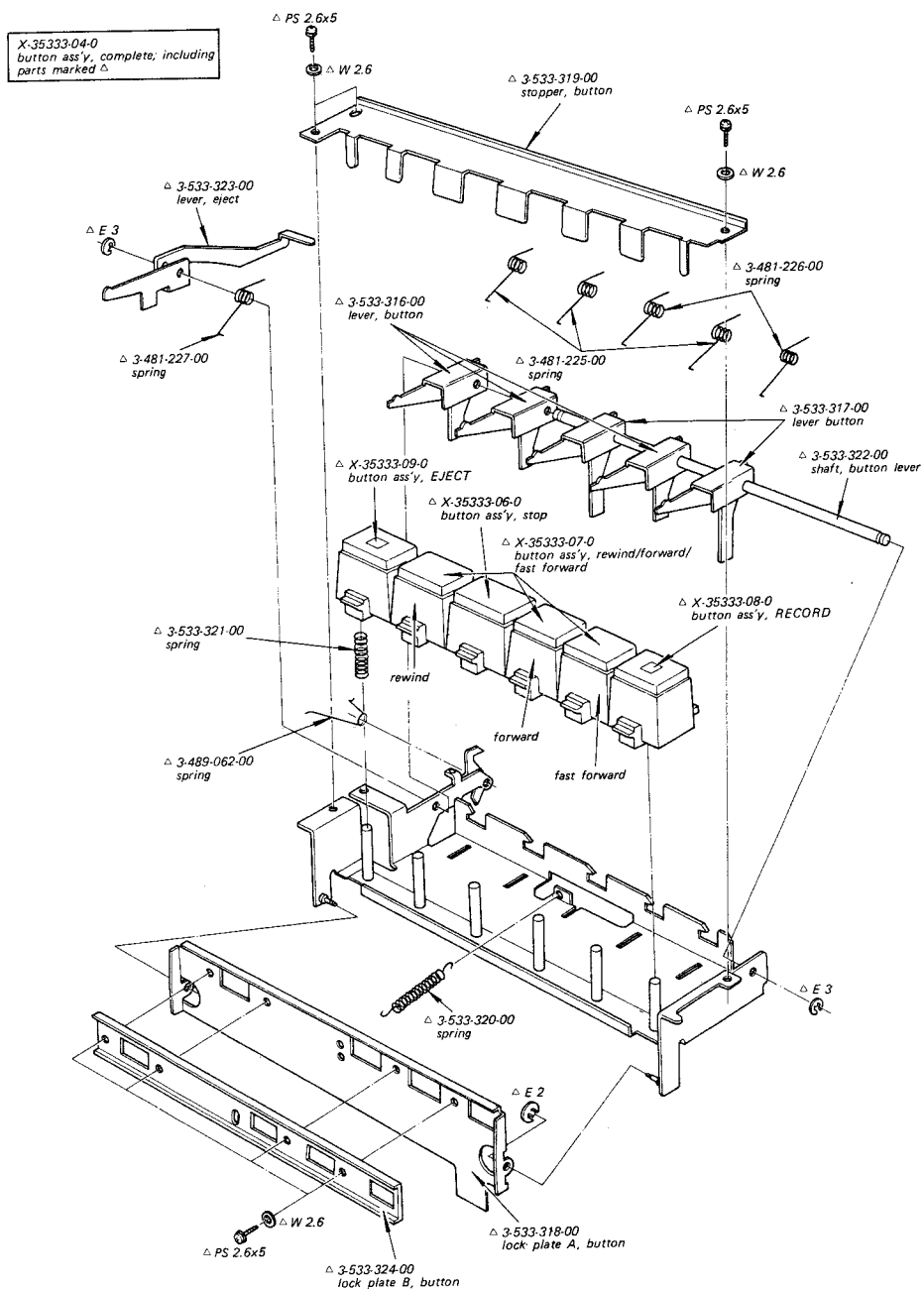
- Parts without part numbers and names are not available.
- All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

5-2. EXPLODED VIEW (2)



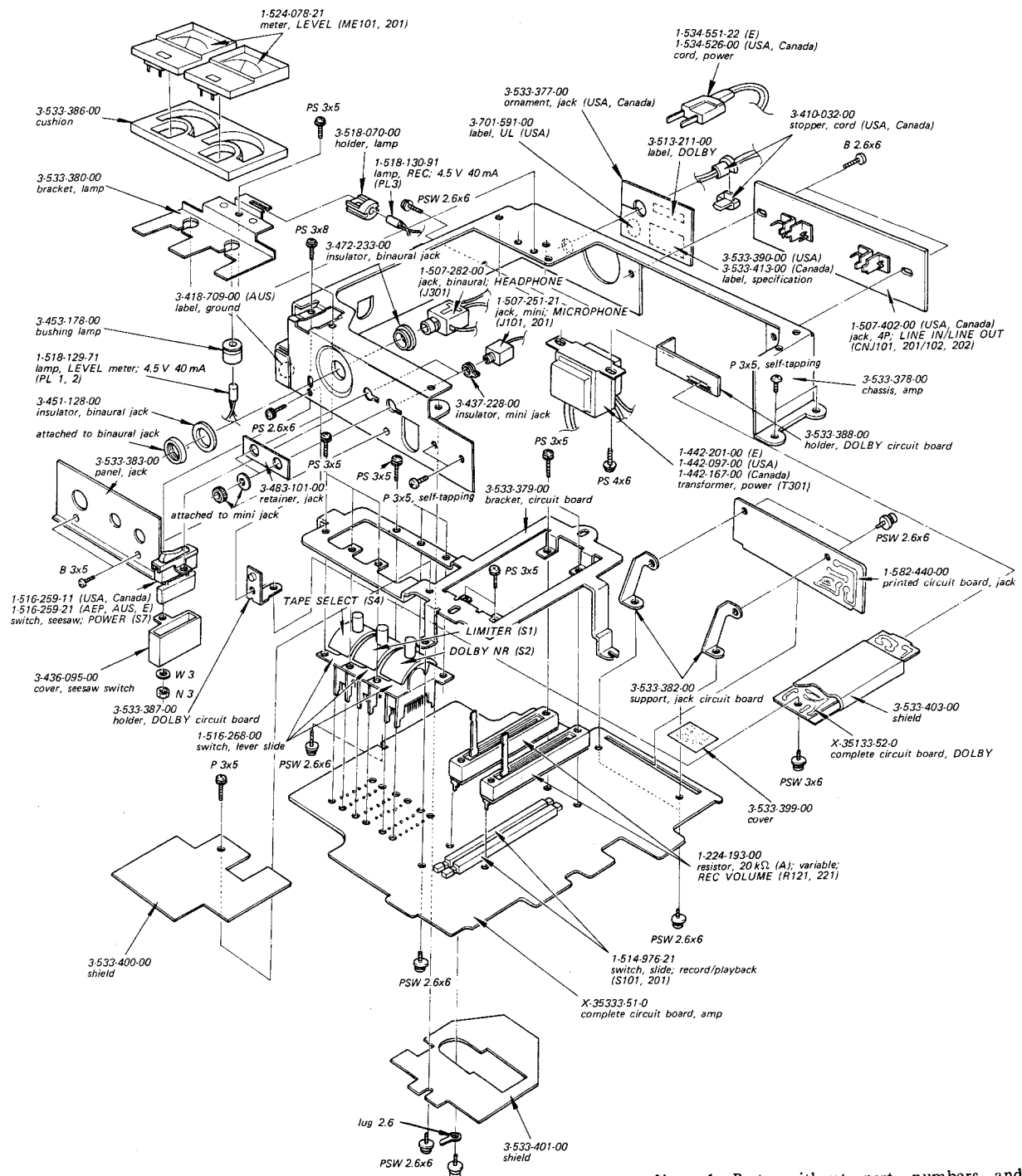
- Note:**
1. Parts without part numbers and names are not available.
 2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

5-3. EXPLODED VIEW (3)



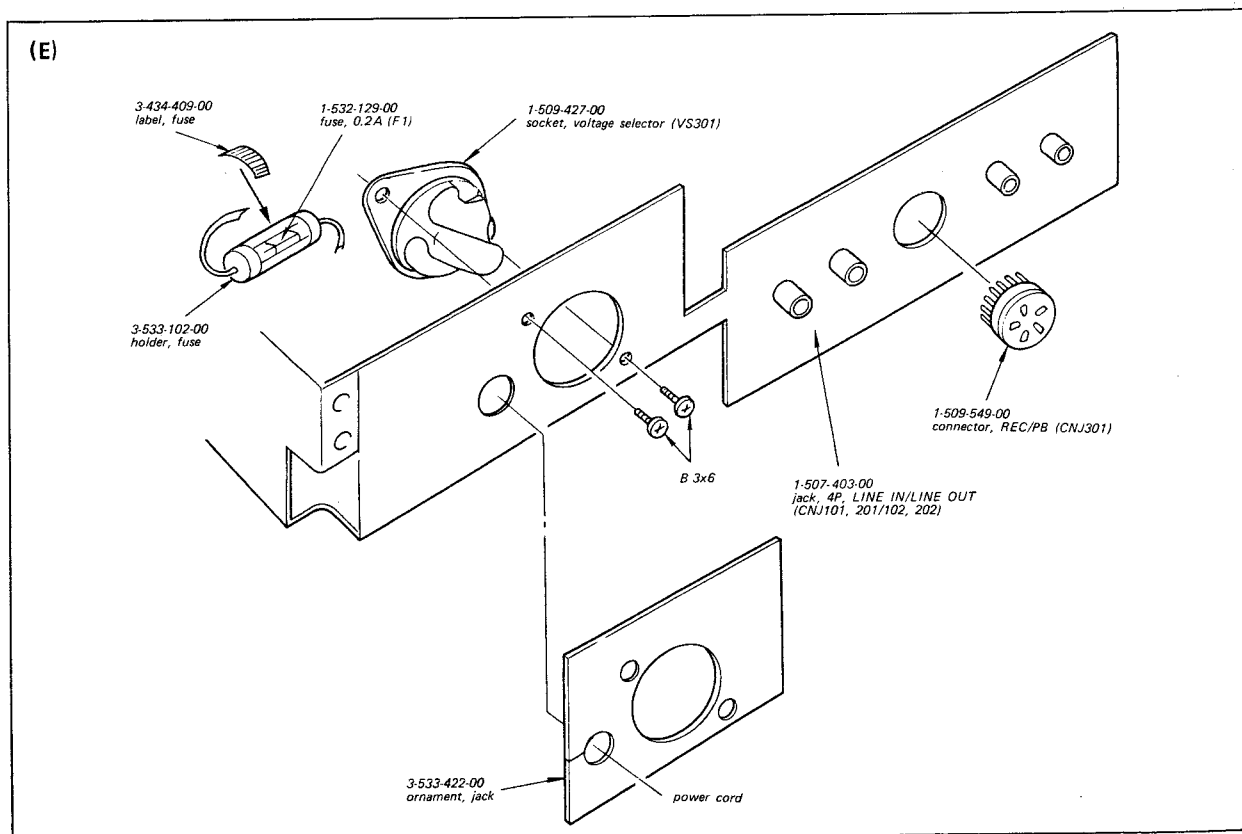
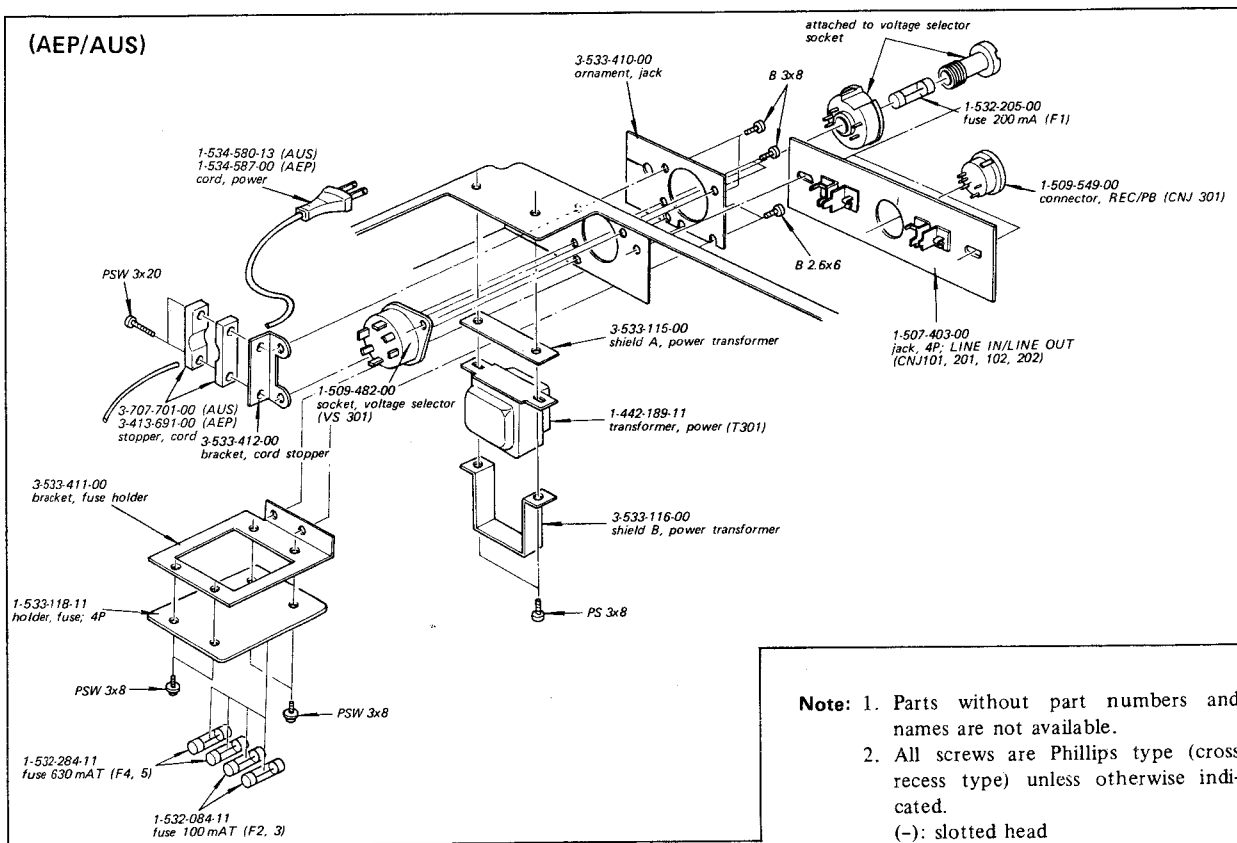
- Note:**
1. Parts without part numbers and names are not available.
 2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

5-4. EXPLODED VIEW (4)

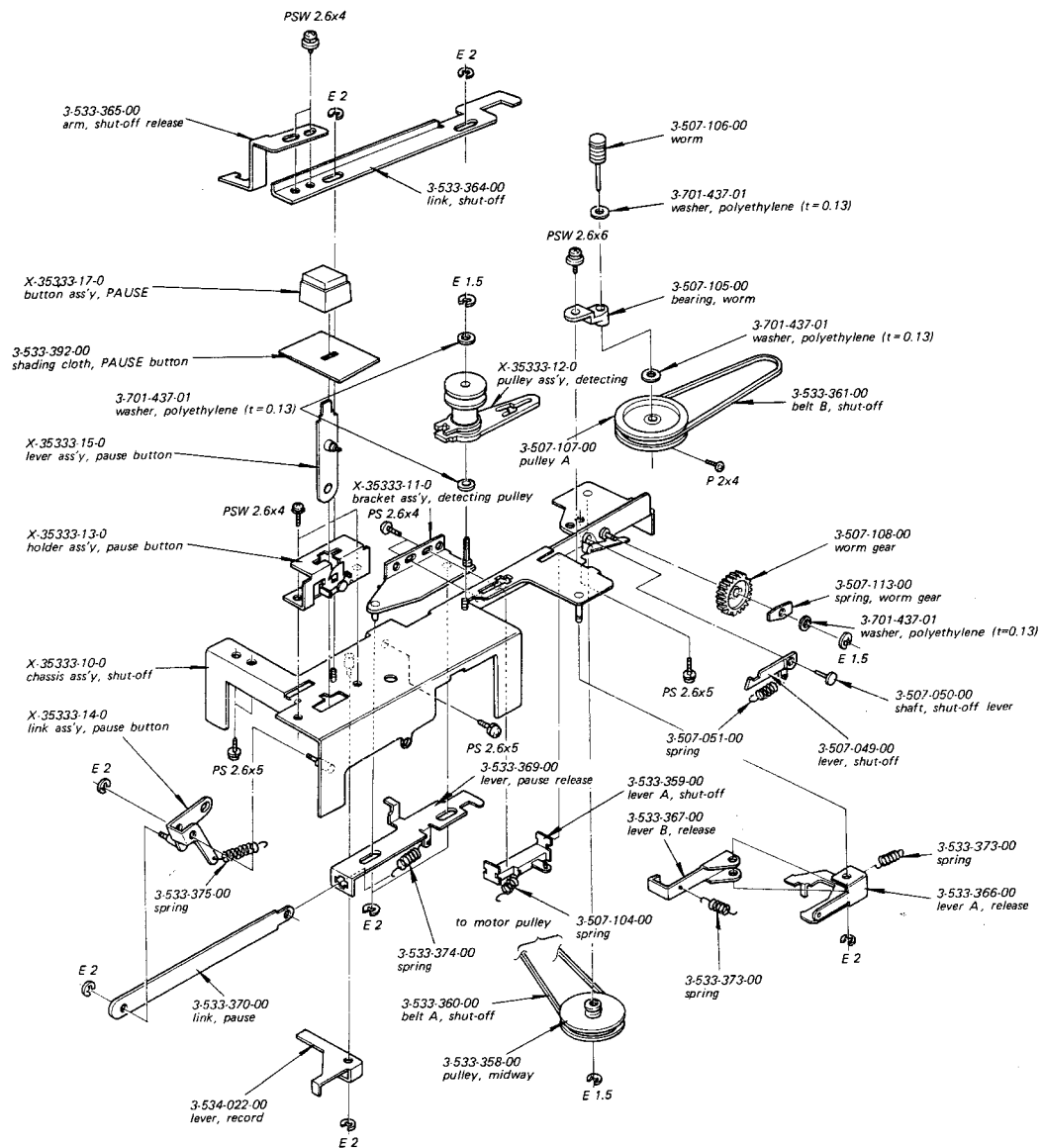


Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

5-5. EXPLODED VIEW (5)



5-6. EXPLODED VIEW (6)

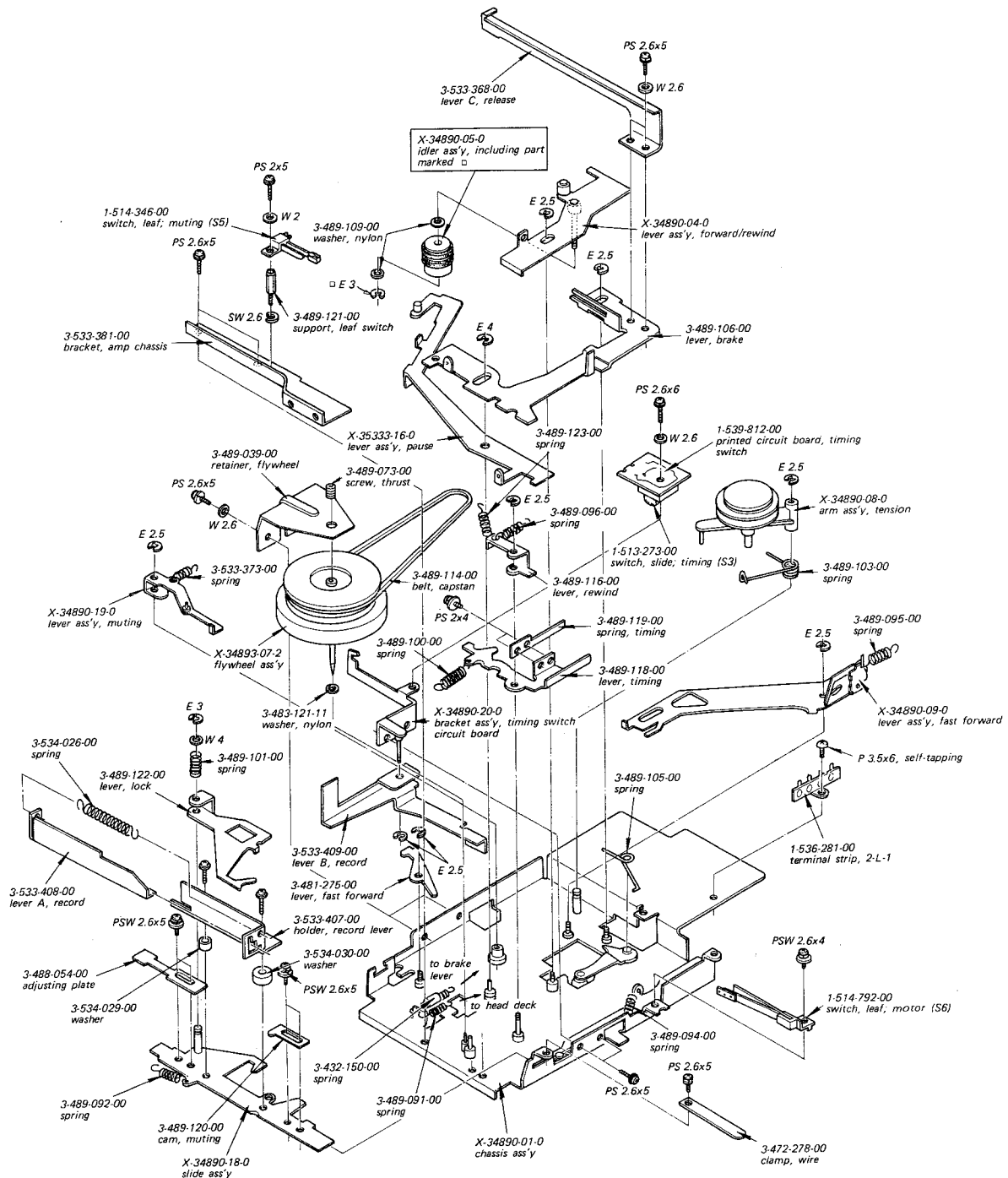


Note: 1. Parts without part numbers and names are not available.

2. All screws are Phillips type (cross recess type) unless otherwise indicated.

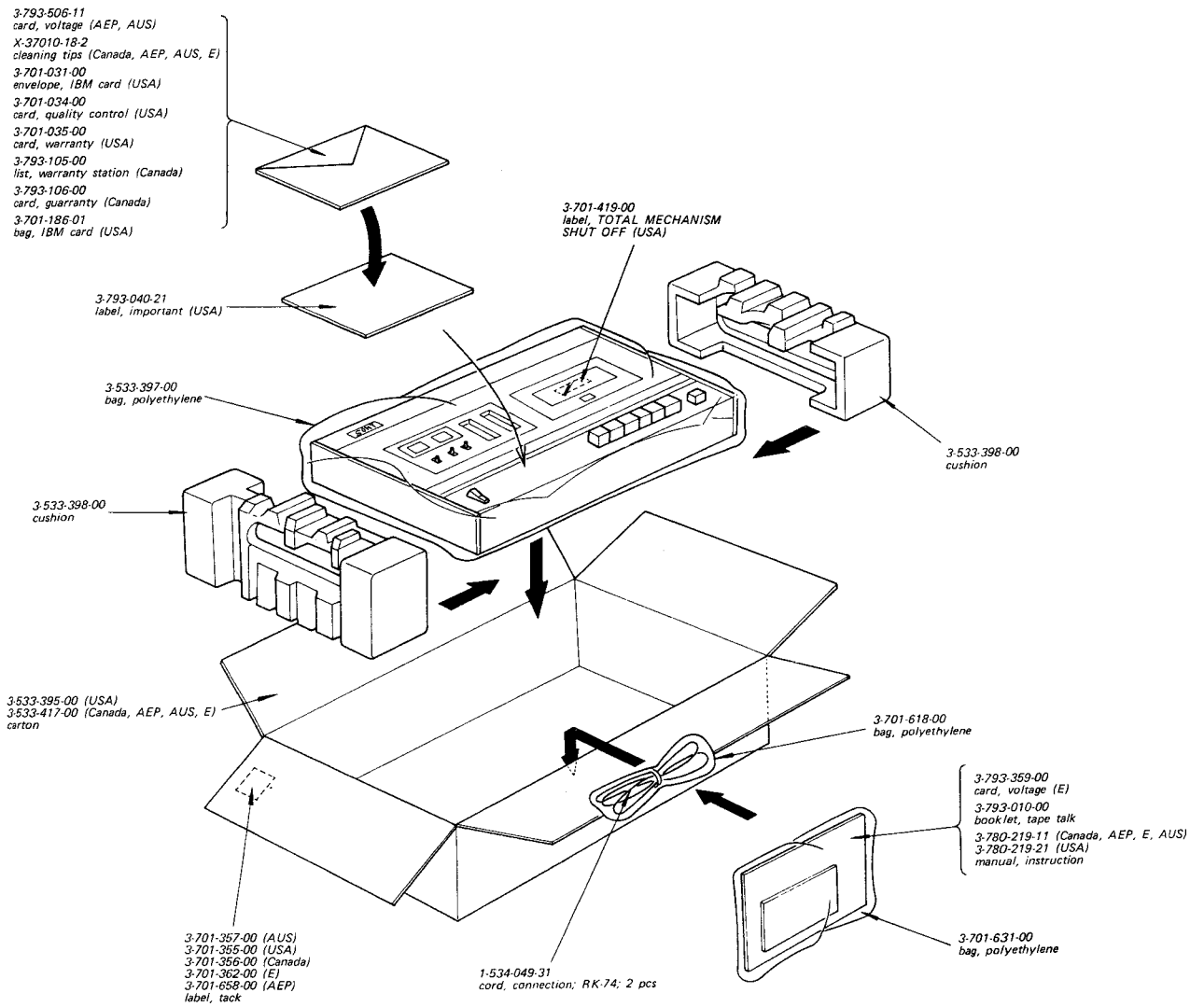
(-): slotted head

5-7. EXPLODED VIEW (7)



- Note:** 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

5-8. PACKING



Note: Parts without part numbers and names are not available.

SECTION 6 ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
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COMPLETE CIRCUIT BOARDS

X-35133-52-0	DOLBY	
X-35333-51-0	amp	

PRINTED CIRCUIT BOARDS

1-539-812-00	timing switch	
1-582-440-00	jack	

SEMICONDUCTORS

Q101, 201	transistor	2SC631A
Q102, 202	transistor	2SC631A
Q103, 203	transistor	2SC633A
Q104, 204	transistor	2SC631A
Q105, 205	transistor	2SC634A
Q106, 206	transistor	2SC634A
Q107, 207	transistor	2SC634A
Q108, 208	transistor	2SC633A
Q301	transistor	2SA678
Q302	transistor	2SC1384
Q501, 601	transistor	2SC634A
Q502, 602	transistor	2SC634A
Q503, 603	transistor	2SC632A
Q504, 604	transistor	2SC634A
Q505, 605	transistor	2SC634A
Q506, 606	transistor	2SC634A
Q507, 607	transistor	2SC634A
D101, 201	diode	VO-6C
D102, 202	diode	10D-05
D103, 203	diode	1T-22
D301	diode	10D-2
D302	diode	10D-2
D303	diode	10D-2
D304	diode	10D-2
D305	diode	10D-2
D306	diode	MZ-08
D501, 601	diode	1T-22
D502, 602	diode	1T-22
D503, 603	diode	1S1555
D504, 604	diode	1S1555

Ref. No.	Part No.	Description
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COILS

L101, 201	1-407-561-00	microinductor, 33 mH
L102, 202	1-407-658-00	trap, 35 mH
L103, 203	1-407-497-00	microinductor, 2.7 mH
L104, 204	1-407-499-00	microinductor, 3.9 mH
L105, 205	1-407-212-00	microinductor, 33 mH

TRANSFORMERS

T101, 201	1-427-299-00	output
T301	1-442-097-00	power (USA)
	1-442-167-00	power (Canada)
	1-442-189-11	power (AEP, AUS)
	1-442-201-00	power (E)
T302	1-433-132-14	bias osc

CAPACITORS

All capacitors are in μF unless otherwise indicated.
(p = $\mu\mu$, elect = electrolytic)

C101, 201	1-107-095-11	270 p	50 V	silvered mica
C102, 202	1-121-651-11	10	16 V	elect
C103, 203	1-121-398-11	10	25 V	elect
C104, 204	1-107-131-11	100 p	50 V	silvered mica
C105, 205	1-107-131-11	100 p	50 V	silvered mica
C106, 206	1-121-420-11	220	10 V	elect
C107, 207	1-105-680-12	0.039	50 V	mylar
C108, 208	1-121-651-11	10	16 V	elect
C109, 209	1-121-402-11	33	10 V	elect
C110, 210	1-107-139-11	220 p	50 V	silvered mica
C111, 211	1-105-821-12	0.001	50 V	mylar
C112, 212	1-121-398-11	10	25 V	elect
C113, 213	1-105-668-12	0.0039	50 V	mylar
C114, 214	1-105-665-12	0.0022	50 V	mylar
C115, 215	1-105-665-12	0.0022	50 V	mylar
C116, 216	1-121-416-11	100	25 V	elect
C117, 217	1-127-020-11	0.22	10 V	solid aluminum
C118, 218	1-127-020-11	0.22	10 V	solid aluminum
C119, 219	1-107-141-11	270 p	50 V	silvered mica
C120, 220	1-121-409-11	47	16 V	elect
C121, 221	1-121-402-11	33	10 V	elect
C122, 222	1-105-821-12	0.001	50 V	mylar
C123, 223	1-107-115-11	22 p	50 V	silvered mica
C124, 224	1-121-651-11	10	16 V	elect
C125, 225	1-107-113-11	18 p	50 V	silvered mica
C126, 226	1-121-402-11	33	10 V	elect
C127, 227	1-121-409-11	47	16 V	elect
C128, 228	1-121-391-11	1	50 V	elect

Ref. No.	Part No.	Description	
C129, 229	1-105-509-12	0.0047	50 V mylar
C130, 230	1-105-685-12	0.1	50 V mylar
C131, 231	1-121-392-11	3.3	25 V elect
C132, 232	1-121-651-11	10	16 V elect
C133, 233	1-121-726-11	0.47	50 V elect
C134, 234	1-105-521-12	0.047	50 V mylar
C135, 235	1-105-517-12	0.022	50 V mylar
C136, 236	1-107-060-11	390 p	500 V silvered mica
C137, 237	1-107-004-11	100 p	500 V silvered mica
C138, 238	1-105-501-12	0.01	50 V mylar
C139, 239	1-121-396-11	4.7	50 V elect
C140, 240	1-107-127-11	68 p	50 V silvered mica
C141, 241	1-121-395-11	4.7	50 V elect
C142, 242	1-121-395-11	4.7	50 V elect
C143, 243	1-107-253-11	15+18+22+27 p	500 V silvered mica
C144, 244	1-107-042-11	2.2 p	500 V silvered mica
C301	1-121-361-11	470	35 V elect
C302	1-121-361-11	470	35 V elect
C303	1-121-411-11	47	50 V elect
C304	1-121-738-11	10	50 V elect
C305	1-121-420-11	220	10 V elect
C306	1-121-426-11	470	16 V elect
C307	1-121-426-11	470	16 V elect
C308	1-105-675-12	0.015	50 V mylar
C309	1-105-680-12	0.039	50 V mylar
C310	1-129-795-11	3900 p	500 V polystyrol
C311	1-131-197-11	3.3	16 V solid tantalum
C312	1-121-398-11	10	25 V elect
C313	1-105-833-12	0.01	50 V mylar
C314	1-105-821-12	0.001	50 V mylar
C501, 601	1-121-392-11	3.3	25 V elect
C502, 602	1-121-404-11	33	25 V elect
C503, 603	1-129-896-21	0.012	±2% 100 V polypropylene
C504, 604	1-129-701-21	0.01	±2% 100 V polypropylene
C505, 605	1-129-899-11	0.056	±2% 100 V polypropylene
C506, 606	1-121-391-11	1	50 V elect
C507, 607	1-107-103-11	6 p	50 V silvered mica
C508, 608	1-121-413-11	100	6.3 V elect
C509, 609	1-107-119-11	33 p	50 V silvered mica
C510, 610	1-121-398-11	10	25 V elect
C511, 611	1-121-409-11	47	16 V elect
C512, 612	1-105-670-12	0.0056	50 V mylar
C513, 613	1-121-402-11	33	10 V elect
C514, 614	1-121-651-11	10	16 V elect
C515, 615	1-129-794-21	0.0033	±2% 100 V polypropylene
C516, 616	1-121-392-11	3.3	25 V elect
C517, 617	1-127-025-11	3.3	10 V solid aluminum
C518, 618	1-105-669-12	0.0047	50 V mylar

Ref. No.	Part No.	Description	
RESISTORS			
All resistors are ¼W, carbon type and in Ω unless otherwise indicated. (k = 1000, M = 1000 k)			
R101, 201	1-244-721-09	100 k	low noise (USA, Canada)
	1-244-739-09	560 k	low noise (AEP, E, AUS)
R102, 202	1-242-668-11	620	(USA, Canada)
R103	1-242-690-11	5.1 k	
R203	1-244-690-11	5.1 k	
R104	1-242-697-09	10 k	low noise
R204	1-244-697-09	10 k	low noise
R105, 205	1-210-832-11	6.8 M	low noise
R106, 206	1-242-734-09	360 k	low noise
R107, 207	1-242-667-11	560	
R108, 208	1-242-687-09	3.9 k	low noise
R109, 209	1-242-649-11	100	
R110, 210	1-242-721-09	100 k	low noise
R111, 211	1-242-709-11	33 k	
R112, 212	1-242-709-09	33 k	low noise
R113, 213	1-242-717-11	68 k	
R114, 214	1-222-701-00	10 k (B),	adjustable: playback equalizer
R115, 215	1-221-979-00	22 k (B),	adjustable: playback level
R116, 216	1-242-687-11	3.9	
R117, 217	1-242-671-11	820	
R118, 218	1-242-701-09	15 k	low noise
R119, 219	1-242-676-11	1.3 k	
R120, 220	1-242-697-11	10 k	
R121, 221	1-224-193-00	20 k (A),	variable: REC VOLUME
R122, 222	1-244-697-11	10 k	
R123, 223	1-244-695-11	8.2 k (AEP, E, AUS)	
R124, 224	1-242-705-11	22 k	
R125, 225	1-242-702-11	16 k	
R126, 226	1-242-719-09	82 k	low noise
R127, 227	1-242-721-09	100 k	low noise
R128, 228	1-242-721-09	100 k	low noise
R129	1-244-671-11	820	
R229	1-242-671-11	820	
R130, 230	1-242-695-11	8.2 k	
R131	1-244-717-11	68 k	
R231	1-242-717-11	68 k	
R132, 232	1-242-683-11	2.7 k	
R133, 233	1-242-689-11	4.7 k	
R134, 234	1-242-677-11	1.5 k	
R135, 235	1-242-713-11	47 k	
R136, 236	1-242-725-11	150 k	
R137	1-244-705-11	22 k	
R237	1-242-705-11	22 k	
R138, 238	1-242-725-11	150 k	
R139, 239	1-222-783-00	47 k (B),	adjustable: record level
R140, 240	1-244-697-11	10 k	
R141	1-242-699-11	12 k	
R241	1-244-699-11	12 k	

When ordering 2%- tolerance resistor and capacitor, note "2%" in addition to part number.

<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>		
R142	1-242-693-11	6.8 k		
R242	1-244-693-11	6.8 k		
R143, 243	1-242-715-11	56 k		
R144, 244	1-242-733-11	330 k		
R145, 245	1-242-673-11	1 k		
R146, 246	1-242-691-11	5.6 k		
R147, 247	1-242-675-11	1.2 k		
R148, 248	1-242-713-11	47 k		
R149	1-242-625-11	10		
R249	1-244-625-11	10		
R150	1-242-633-11	22		
R250	1-244-633-11	22		
R151	1-242-688-11	4.3 k		
R251	1-244-688-11	4.3 k		
R152, 252	1-242-699-11	12 k		
R153, 253	1-242-709-11	33 k		
R154, 254	1-244-693-11	6.8 k		
R155, 255	1-242-681-11	2.2 k		
R156, 256	1-242-695-11	8.2 k		
R157, 257	1-242-677-11	1.5 k		
R158, 258	1-242-681-11	2.2 k		
R159, 259	1-221-978-00	4.7 k (B), adjustable: meter level		
R301	1-206-081-11	100	1W	metal oxide
R302	1-244-897-11	10 k	½W	
R303	1-242-709-11	33 k		
R304	1-242-707-11	27 k		
R305		-----		
R306	1-202-547-31	82	½W	composition
R307	1-202-549-31	100	½W	composition
R308	1-202-557-31	220	½W	composition
R309	1-242-697-11	10 k		
R310	1-242-721-11	100 k		
R311	1-242-651-11	150		
R312	1-206-094-11	1.2 k	1W	metal oxide
R313	1-206-092-11	820	1W	metal oxide
R314	1-242-619-11	1		
R501, 601	1-210-858-11	200 k	±2%	
R502, 602	1-210-854-11	27 k	±2%	
R503, 603	1-242-729-09	220 k		low noise
R504, 604	1-242-719-09	82 k		low noise
R505, 605	1-242-699-09	12 k		low noise
R506, 606	1-242-737-09	470 k		low noise
R507, 607	1-242-737-09	470 k		low noise
R508, 608	1-242-641-11	47		
R509, 609	1-210-853-11	6.2 k	±2%	
R510, 610	1-242-719-09	82 k		low noise
R511, 611	1-242-721-09	100 k		low noise
R512, 612	1-242-701-09	15 k		low noise

When ordering 2%- tolerance resistor and capacitor, note "2%" in addition to part number.

<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>		
R513, 613	1-242-721-09	100 k		low noise
R514, 614	1-242-695-09	8.2 k		low noise
R515, 615	1-242-687-11	3.9 k		
R516, 616	1-210-856-11	68 k	±2%	
R517, 617	1-210-815-11	910	±2%	
R518, 618	1-242-689-11	4.7 k		
R519, 619	1-242-677-11	1.5 k		
R520, 620	1-242-721-11	100 k		
R521, 621	1-242-719-11	82 k		
R522, 622	1-242-701-11	15 k		
R523, 623	1-242-723-11	120 k		
R524, 624	1-242-695-11	8.2 k		
R525, 625	1-210-850-11	300	±2%	
R526, 626	1-242-705-11	22 k		
R527, 627	1-242-695-11	8.2 k		
R528, 628	1-210-855-11	33 k	±2%	
R529, 629	1-210-855-11	33 k	±2%	
R530, 630	1-210-852-11	5.6 k	±2%	
R531, 631	1-242-601-11	1		
R532, 632	1-242-701-11	15 k		
R533, 633	1-242-719-11	82 k		
R534, 634	1-242-713-11	47 k		
R535, 635	1-242-727-11	180 k		
R536, 636	1-242-727-11	180 k		
R537, 637	1-242-637-11	33		
R538, 638	1-242-721-11	100 k		
R539, 639	1-242-653-11	150		

SWITCHES

S1	1-516-268-00	lever slide, LIMITER
S2	1-516-268-00	lever slide, DOLBY NR
S3	1-513-273-00	slide, timing
S4	1-516-268-00	lever slide, TAPE SELECT
S5	1-514-346-00	leaf, muting
S6	1-514-792-00	leaf, motor
S7	1-516-259-11	seesaw, POWER (USA, Canada)
	1-516-259-21	seesaw, POWER (AEP, E, AUS)
S101, 201	1-514-976-21	slide, record/playback

JACKS

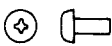
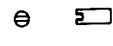
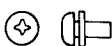




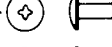
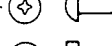
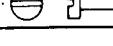
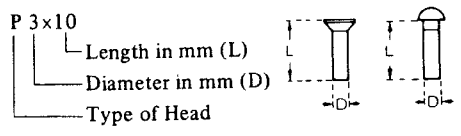
J101, 201	1-507-251-21	mini, MICROPHONE
J301	1-507-282-00	binaural, HEADPHONE
CNJ101, 201	1-507-402-00	4 P, LINE IN (USA, Canada)
	1-507-403-00	4 P, LINE IN (AEP, E, AUS)
CNJ102, 202	1-507-402-00	4 P, LINE OUT (USA, Canada)
	1-507-403-00	4 P, LINE OUT (AEP, E, AUS)
CNJ301	1-509-549-00	connector, REC/PB (AEP, E, AUS)
	1-509-482-00	socket, voltage selector (AEP, AUS)
VS301	1-509-427-00	socket, voltage selector (E)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
MISCELLANEOUS					
CP301	1-231-057-31	encapsulated component C-R, 0.033 μ F + 120 Ω (USA, Canada)	M	8-834-015-01	motor, D-015G
	1-231-057-12	encapsulated component C-R, 0.033 μ F + 120 Ω (E)		1-534-526-00	cord, power (USA, Canada)
ME101, 201	1-524-078-21	meter, LEVEL		1-534-551-22	cord, power (E)
PL1, 2	1-518-129-71	lamp, LEVEL meter; 4.5 V 40 mA		1-534-587-00	cord, power (AEP, AUS)
PL3	1-518-130-91	lamp, REC; 4.5 V 40 mA	F1	1-532-205-00	fuse 200 mA (AEP, AUS)
EH	8-825-506-00	head, erase (EF 135-36)	F2, 3	1-532-129-00	fuse 0.2A (E)
RPH	8-825-584-00	head, record/playback (PF145-3602A6)	F4, 5	1-532-084-11	fuse 100 mA (AEP, AUS)
				1-532-284-11	fuse 630 mA (AEP, AUS)
				1-533-118-11	holder, fuse; 4 P (AEP, AUS)
				1-533-102-00	holder, fuse (E)

SECTION 7 HARDWARE

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
SCREWS		RETAINING RINGS	
All screws are phillips type (cross recess type) unless otherwise indicated. (-): slotted head.		7-624-102-01	E 1.5
7-621-255-25	P 2 x 4	7-624-104-01	E 2
7-621-255-45	P 2 x 6	7-624-106-01	E 3
7-621-259-01	PS 2.6 x 4	7-624-108-01	E 4
7-621-259-15	P 2.6 x 3	7-624-118-01	E 2.5
7-621-259-25	P 2.6 x 4		
7-621-305-35	(-) F 2 x 5	WASHERS	
7-621-559-52	K 2.6 x 8	7-623-105-02	2 (small)
7-621-710-39	(-) SC 2 x 4	7-623-105-12	2 (middle)
7-621-759-45	PSW 2.6 x 6	7-623-107-02	2.6 (small)
7-621-759-75	PSW 2.6 x 10	7-623-107-12	2.6 (middle)
7-621-770-62	B 2.6 x 5	7-623-108-02	3 (small)
7-621-771-13	B 2.6 x 6	7-623-108-12	3 (middle)
7-621-771-38	B 2.6 x 8	7-623-108-15	3 (middle)
7-621-843-25	R 3.1 x 10, wooden	7-623-110-02	4 (small)
7-628-253-15	PS 2 x 5		
7-628-253-35	PS 2 x 8	SPRING WASHERS	
7-628-254-03	PS 2.6 x 5	7-623-205-11	2
7-628-254-05	PS 2.6 x 5	7-623-207-22	2.6
7-628-254-12	PS 2.6 x 6		
7-628-254-25	PS 2.6 x 8	MISCELLANEOUS	
7-682-548-04	B 3 x 8	7-623-507-01	lug, 2.6; egg type
7-682-646-01	PS 3 x 5	7-671-112-01	steel ball, 2
7-682-648-01	PS 3 x 8	7-671-112-11	steel ball, 2.5
7-682-659-01	PS 4 x 5	7-684-013-01	nut, 3
7-682-947-01	PSW 3 x 6		
7-682-953-00	PSW 3 x 20		
7-685-144-41	P 3 x 5, self-tapping		
7-685-145-23	P 3 x 6, self-tapping		

— Hardware Nomenclature —

P — Pan Head Screw		SC — Set Screw	
PS — Pan Head Screw with Spring Washer		E — Retaining Ring (E Washer)	
K — Flat Countersunk Head Screw		W — Washer	
B — Binding Head Screw		SW — Spring Washer	
RK — Oval Countersunk Head Screw		LW — Lock Washer	
T — Truss Head Screw		N — Nut	
R — Round Head Screw		— Example —	
F — Flat Fillister Head Screw			

SUPPLEMENT

This supplement updates the service manual to include production changes starting with **Serial No. 45,601 and later.**

File this supplement with the service manual.

Subject: Change and Addition of Circuit Board

No. 1

December, 1973

ADDED PARTS

Part No.	Description
A-2095-004-A	complete circuit board, filter
1-582-966-00	printed circuit board, shield
3-533-428-00	bracket, circuit board
3-533-430-00	shield
3-533-431-00	shield C
3-533-432-00	shield D

CHANGED PARTS

Part No.		Description
Former	New	
X-35333-51-0	A-2010-002-A	complete circuit board, amp
3-489-122-00	3-533-429-00	lever, lock

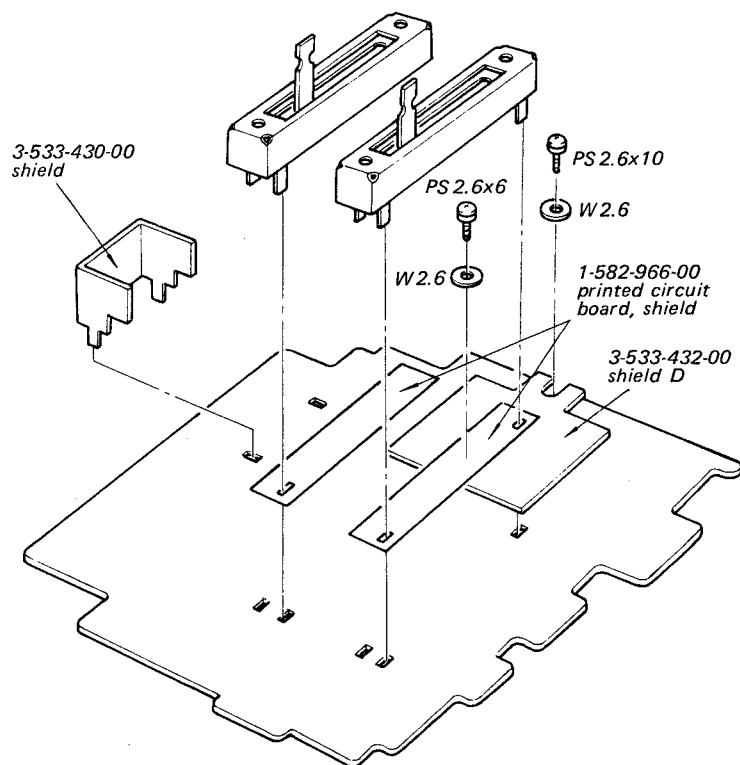
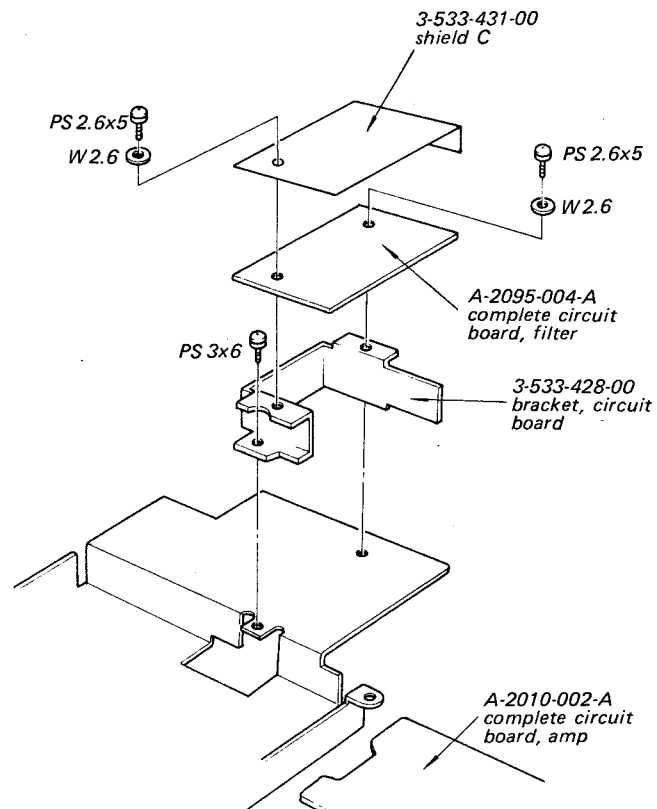
OMITTED PARTS

Part No.	Description
3-533-401-00	shield

SERVICE MANUAL

MC-Service

1. CHANGED PORTIONS OF EXPLODED VIEW



2. ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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COMPLETE CIRCUIT BOARDS

X-35133-52-0	DOLBY
A-2010-002-A	Amp
A-2095-004-A	Filter

PRINTED CIRCUIT BOARDS

1-539-812-00	Timing Switch
1-582-440-00	Jack

SEMICONDUCTORS

Q101,201	Transistor	2SC631A
Q102,202	Transistor	2SC631A
Q103,203	Transistor	2SC633A
Q104,204	Transistor	2SC631A
Q105,205	Transistor	2SC634A
Q106,206	Transistor	2SC634A
Q107,207	Transistor	2SC634A
Q108,208	Transistor	2SC633A

Q301	Transistor	2SA678
Q302	Transistor	2SC1384

Q501,601	Transistor	2SC634A
Q502,602	Transistor	2SC634A
Q503,603	Transistor	2SC632A
Q504,604	Transistor	2SC634A
Q505,605	Transistor	2SC634A
Q506,606	Transistor	2SC634A
Q507,607	Transistor	2SC634A

D101,201	Diode	VO6C
D102,202	Diode	10D-05
D103,203	Diode	1T22

D301	Diode	SIB01-02
D302	Diode	SIB01-02
D303	Diode	SIB01-02
D304	Diode	SIB01-02
D305	Diode	SIB01-02
D306	Diode	SIB01-02
D307	Diode	MZ08

D501,601	Diode	1T22A
D502,602	Diode	1T22A

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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D503,603	Diode	1S1555
D504,604	Diode	1S1555

COILS

L101,201	1-407-561-00	33 mH, microinductor
L102,202	1-407-658-00	35 mH, trap
L103,203	1-407-500-00	4.7 mH, microinductor
L104,204	1-407-500-00	4.7 mH, microinductor
L105,205	1-407-561-00	33 mH, microinductor

TRANSFORMERS

T101,201	1-427-299-00	Output
T301	1-442-167-00	Power (Canada)
	1-442-185-11	Power (USA)
	1-442-189-11	Power (AEP, AUS)
	1-442-201-11	Power (E)
T302	1-433-132-00	Bias Osc

CAPACITORS

All capacitors are μF unless otherwise indicated. (p = μF , elect = electrolytic)

C101,201	1-107-097-11	330 p	50 V	silvered mica
C102,202	1-121-651-11	10	16 V	elect
C103,203	1-121-398-11	10	25 V	elect
C104,204	1-107-137-11	180 p	50 V	silvered mica
C105,205	1-107-131-11	100 p	50 V	silvered mica
C106,206	1-107-141-11	270 p	50 V	silvered mica
C107,207	1-121-420-11	220	10 V	elect
C108,208	1-105-680-12	0.039	50 V	mylar
C109,209	1-105-513-12	0.01	50 V	mylar
C110,210	1-121-402-11	33	10 V	elect
C111,211	1-105-821-12	0.001	50 V	mylar
C112,212	1-121-398-11	10	25 V	elect
C113,213	1-105-668-12	0.0039	50 V	mylar
C114,214	1-105-665-12	0.0022	50 V	mylar
C115,215	1-105-665-12	0.0022	50 V	mylar
C116,216	1-121-416-11	100	25 V	elect
C117,217	1-131-211-11	0.22	35 V	solid tantalum
C118,218	1-131-211-11	0.22	35 V	solid tantalum
C119,219	1-107-141-11	270 p	50 V	silvered mica
C120,220	1-121-409-11	47	16 V	elect

The word DOLBY is a trademark of Dolby Laboratories, Inc.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R133,233	1-242-689-11	4.7k	
R134,234	1-242-677-11	1.5k	
R135,235	1-242-713-11	47k	
R136,236	1-242-725-11	150k	
R137,237	1-242-705-11	22k	
R138	1-242-725-11	150k	
R238	1-244-725-11	150k	
R139,239	1-222-783-00	47k, adjustable	
R140	1-244-697-11	10k	
R240	1-242-697-11	10k	
R141,241	1-244-697-11	10k	
R142,242	1-244-697-11	10k	
R143,243	1-242-715-11	56k	
R144	1-244-733-11	330k	
R244	1-242-733-11	330k	
R145,245	1-242-673-11	1k	
R146,246	1-242-691-11	5.6k	
R147,247	1-242-675-11	1.2k	
R148,248	1-242-713-11	47k	
R149	1-242-625-11	10	
R249	1-244-625-11	10	
R150	1-242-647-11	82	
R250	1-244-647-11	82	
R151,251	1-244-688-11	4.3k	
R152	1-244-699-11	12k	
R252	1-242-699-11	12k	
R153,253	1-242-709-11	33k	
R154,254	1-244-693-11	6.8k	
R155,255	1-242-681-11	2.2k	
R156,256	1-242-695-11	8.2k	
R157,257	1-242-677-11	1.5k	
R158,258	1-242-681-11	2.2k	
R159,259	1-221-978-00	4.7k, adjustable	
R160	1-242-693-11	6.8k	
R260	1-244-693-11	6.8k	
R301	1-206-081-11	100	1W metal oxide
R302	1-244-897-11	10k	½W
R303	1-242-709-11	33k	
R304	1-242-707-11	27k	
R305	1-242-683-11	2.7k	
R306	1-202-547-31	82	½W composition
R307	1-202-549-31	100	½W composition
R308	1-202-557-31	220	½W composition
R309	1-242-697-11	10k	
R310	1-242-721-11	100k	
R311	1-242-653-11	150	
R312	1-206-093-11	1k	1W metal oxide
R313	1-206-091-11	680	1W metal oxide
R314	1-242-601-11	1	
R501,601	1-210-858-11	200k ±2%	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R502,602	1-210-854-11	27k ±2%	
R503,603	1-242-729-09	220k, low noise	
R504,604	1-242-719-09	82k, low noise	
R505,605	1-242-699-09	12k, low noise	
R506,606	1-242-737-09	470k, low noise	
R507,607	1-242-737-09	470k, low noise	
R508,608	1-242-641-11	47	
R509,609	1-210-853-11	6.2k ±2%	
R510,610	1-242-719-09	82k, low noise	
R511,611	1-242-721-09	100k, low noise	
R512,612	1-242-701-09	15k, low noise	
R513,613	1-242-721-09	100k, low noise	
R514,614	1-242-695-09	8.2k, low noise	
R515,615	1-242-687-11	3.9k	
R516,616	1-210-856-11	68k ±2%	
R517,617	1-210-815-11	910 ±2%	
R518,618	1-242-689-11	4.7k	
R519,619	1-242-677-11	1.5k	
R520,620	1-242-721-11	100k	
R521,621	1-242-719-11	82k	
R522,622	1-242-701-11	15k	
R523,623	1-242-723-11	120k	
R524,624	1-242-695-11	8.2k	
R525,625	1-210-850-11	300 ±2%	
R526,626	1-242-705-11	22k	
R527,627	1-242-695-11	8.2k	
R528,628	1-210-855-11	33k ±2%	
R529,629	1-210-855-11	33k ±2%	
R530,630	1-210-852-11	5.6k ±2%	
R531,631	1-242-601-11	1	
R532,632	1-242-701-11	15k	
R533,633	1-242-719-11	82k	
R534,634	1-242-713-11	47k	
R535,635	1-242-727-11	180k	
R536,636	1-242-727-11	180k	
R537,637	1-242-637-11	33	
R538,638	1-242-721-11	100k	
R539,639	1-242-653-11	150	
SWITCHES			
S1	1-516-268-00	lever slide, LIMITER	
S2	1-516-268-00	lever slide, DOLBY NR	
S3	1-513-273-00	slide, timing	
S4	1-516-268-00	lever slide, TAPE SELECT	
S5	1-514-346-00	leaf, muting	
S6	1-514-792-00	leaf, motor	
S7	1-516-259-11	seesaw, POWER (USA, Canada)	
	1-516-259-21	seesaw, POWER (E, AEP, AUS)	
S101,201	1-514-976-21	slide, record/playback	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
JACKS		
J101,201	1-507-251-21	mini, MICROPHONE
J301	1-507-282-31	binaural, HEADPHONE
CNJ101,201	1-507-402-00	4p, LINE IN (USA, Canada)
	1-507-403-00	4p, LINE IN (E, AEP, AUS)
CNJ102,202	1-507-402-00	4p, LINE OUT (USA, Canada)
	1-507-403-00	4p, LINE OUT (E, AEP, AUS)
CNJ301	1-509-549-00	Connector, REC/PB (E, AEP, AUS)
MISCELLANEOUS		
E.H	8-825-506-00	Head, erase; EF135-36
F1	1-532-129-11	Fuse, 0.2A (E)
	1-532-205-11	Fuse, 200 mA (AEP, AUS)
F2	1-532-084-11	Fuse, 100 mA (AEP, AUS)
F3	1-532-084-11	Fuse, 100 mA (AEP, AUS)
F4	1-532-284-11	Fuse, 630 mA (AEP, AUS)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
F5	1-532-284-11	Fuse, 630 mA (AEP, AUS)
M	8-834-015-01	Motor, D-015G
PL1	1-518-129-00	Lamp, 4.5 V 40 mA
PL2	1-518-129-00	Lamp, 4.5 V 40 mA
PL3	1-518-130-71	Lamp, 4.5 V 40 mA
	1-231-057-12	Encapsulated Component C-R,
CP301	1-231-057-12	0.033μF + 120 Ω (E)
	1-231-057-21	Encapsulated Component C-R,
		0.033μF + 120 Ω (USA, Canada)
	1-524-078-21	Meter, level
	1-533-102-11	Holder, fuse (E)
	1-533-118-11	Holder, fuse (AEP, AUS)
	1-534-526-21	Cord, power (USA, Canada)
	1-534-551-00	Cord, power (E)
	1-534-580-13	Cord, power (AUS)
	1-534-587-11	Cord, power (AEP)
	1-509-427-12	Socket, voltage selector (E)
	1-509-482-11	Socket, voltage selector (AEP, AUS)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
JACKS		
J101,201	1-507-251-21	mini, MICROPHONE
J301	1-507-282-31	binaural, HEADPHONE
CNJ101,201	1-507-402-00	4p, LINE IN (USA, Canada)
	1-507-403-00	4p, LINE IN (E, AEP, AUS)
CNJ102,202	1-507-402-00	4p, LINE OUT (USA, Canada)
	1-507-403-00	4p, LINE OUT (E, AEP, AUS)
CNJ301	1-509-549-00	Connector, REC/PB (E, AEP, AUS)

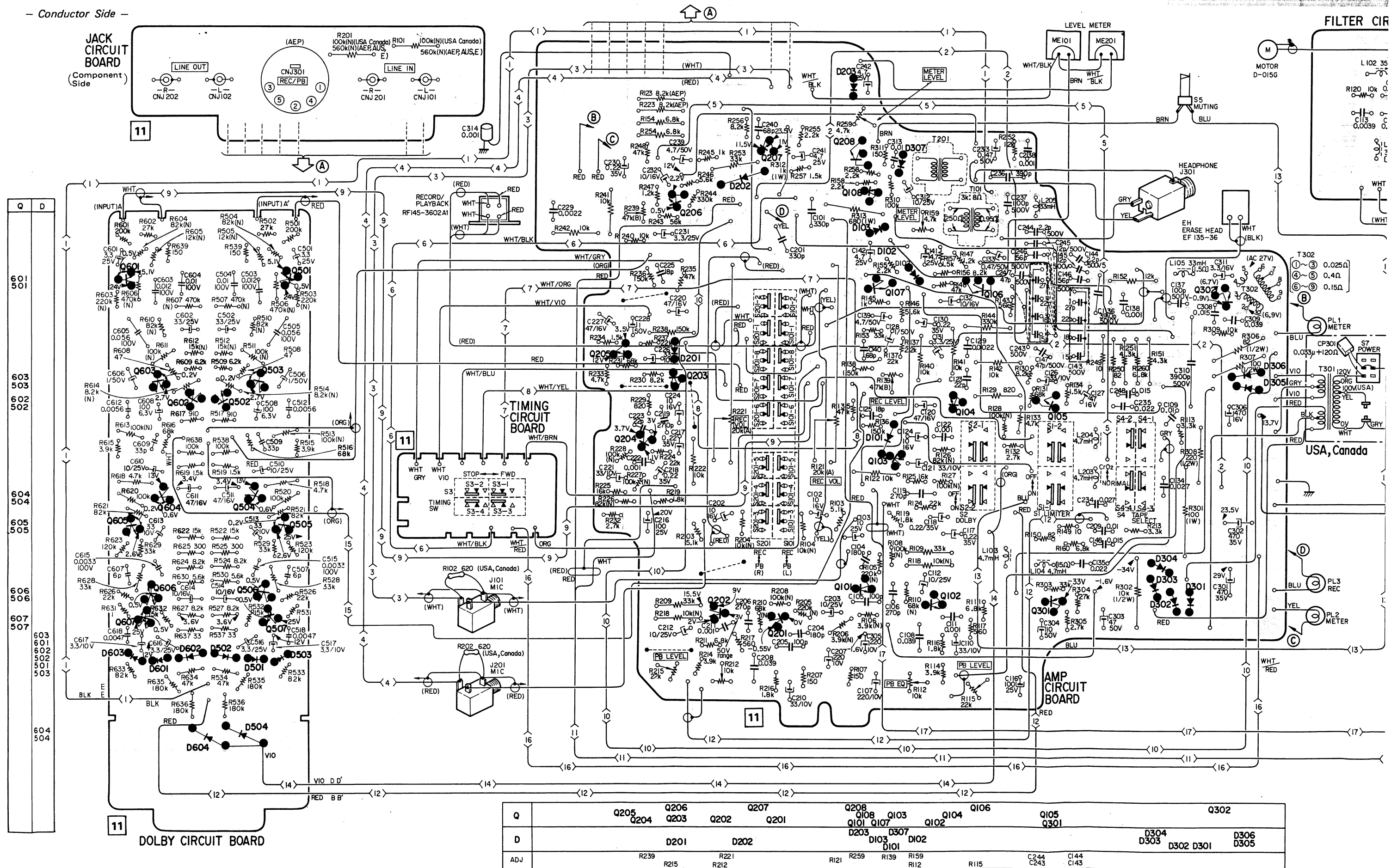
MISCELLANEOUS

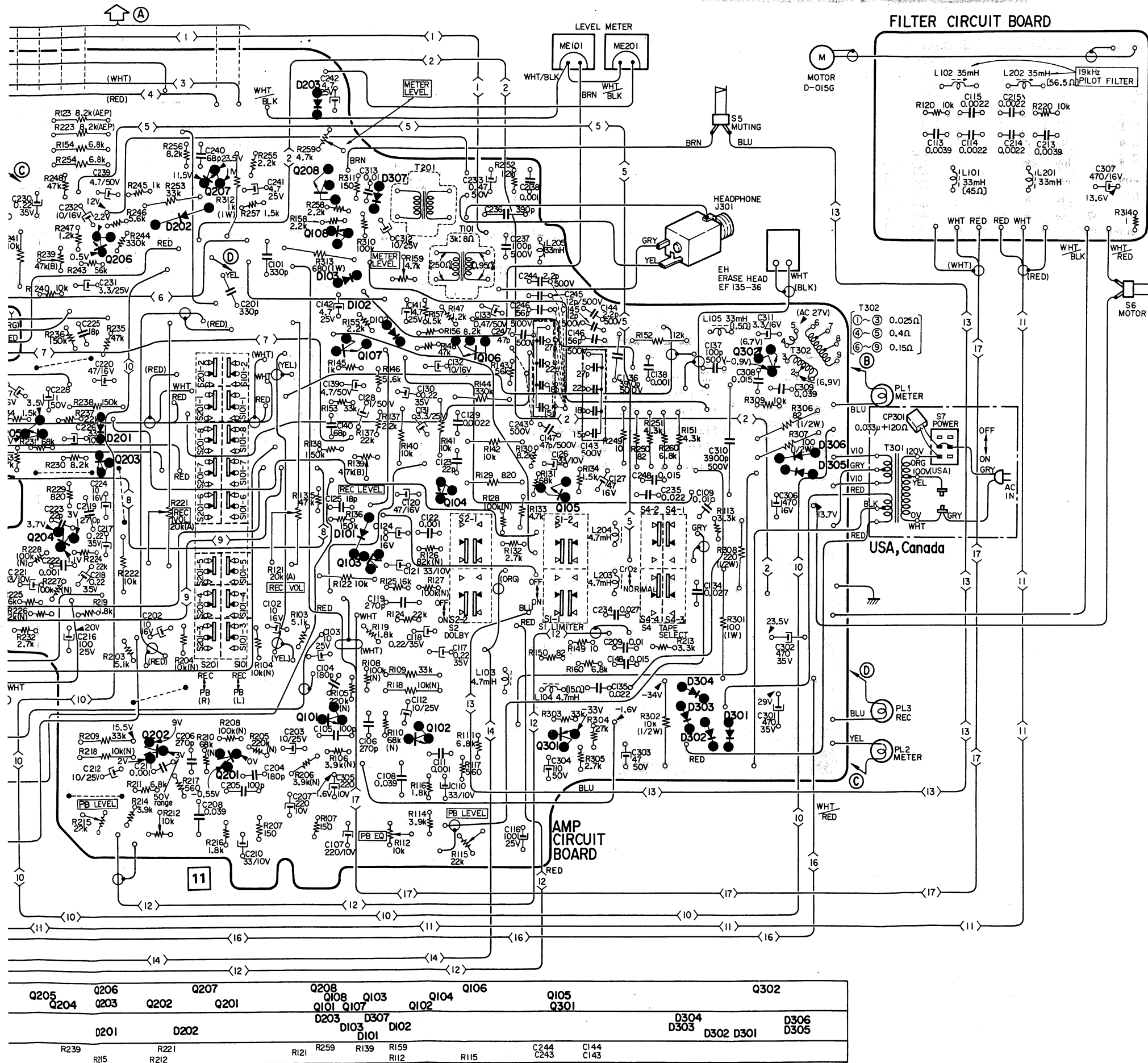
E.H	8-825-506-00	Head, erase; EF135-36
F1	1-532-129-11	Fuse, 0.2A (E)
	1-532-205-11	Fuse, 200 mA (AEP, AUS)
F2	1-532-084-11	Fuse, 100 mA (AEP, AUS)
F3	1-532-084-11	Fuse, 100 mA (AEP, AUS)
F4	1-532-284-11	Fuse, 630 mA (AEP, AUS)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
F5	1-532-284-11	Fuse, 630 mA (AEP, AUS)
M	8-834-015-01	Motor, D-015G
PL1	1-518-129-00	Lamp, 4.5 V 40 mA
PL2	1-518-129-00	Lamp, 4.5 V 40 mA
PL3	1-518-130-71	Lamp, 4.5 V 40 mA
CP301	1-231-057-12	Encapsulated Component C-R,
	1-231-057-12	0.033 μ F + 120 Ω (E)
CP301	1-231-057-21	Encapsulated Component C-R,
		0.033 μ F + 120 Ω (USA, Canada)
	1-524-078-21	Meter, level
	1-533-102-11	Holder, fuse (E)
	1-533-118-11	Holder, fuse (AEP, AUS)
	1-534-526-21	Cord, power (USA, Canada)
	1-534-551-00	Cord, power (E)
	1-534-580-13	Cord, power (AUS)
	1-534-587-11	Cord, power (AEP)
	1-509-427-12	Socket, voltage selector (E)
	1-509-482-11	Socket, voltage selector (AEP, AUS)

3. MOUNTING DIAGRAM

— Conductor Side —





Note:

- All resistors and capacitors are in Ω and μF unless otherwise specified.
- Letter in () suffixed to variable resistor value indicates characteristics.
- Chassis ground
- Components for R-CH have the same values as for L-CH.
- Switch mode:

Ref. No.	Switch	Mode
S101, 201	record/playback	playback
S1	LIMITER	ON
S2	DOLBY NR	ON
S3	timing	STOP
S4	TAPE SELECT	CrO ₂
S5	muting	OFF
S6	motor	OFF
S7	POWER	ON

2% Tolerance Identification

Resistor: value tolerance (gold: $\pm 5\%$)

Capacitor: value G mark indicates $\pm 2\%$ tolerance

Red line (or dot) indicates $\pm 2\%$ tolerance selected from resistors of $\pm 5\%$ tolerance

Color in () indicates tube color of lead wire.

Q101, 201
102, 202 2SC631A
104, 204
503, 603 2SC632A
103, 203 2SC633A
108, 208
105, 205
107, 207
501, 601
502, 602
504, 604
507, 607

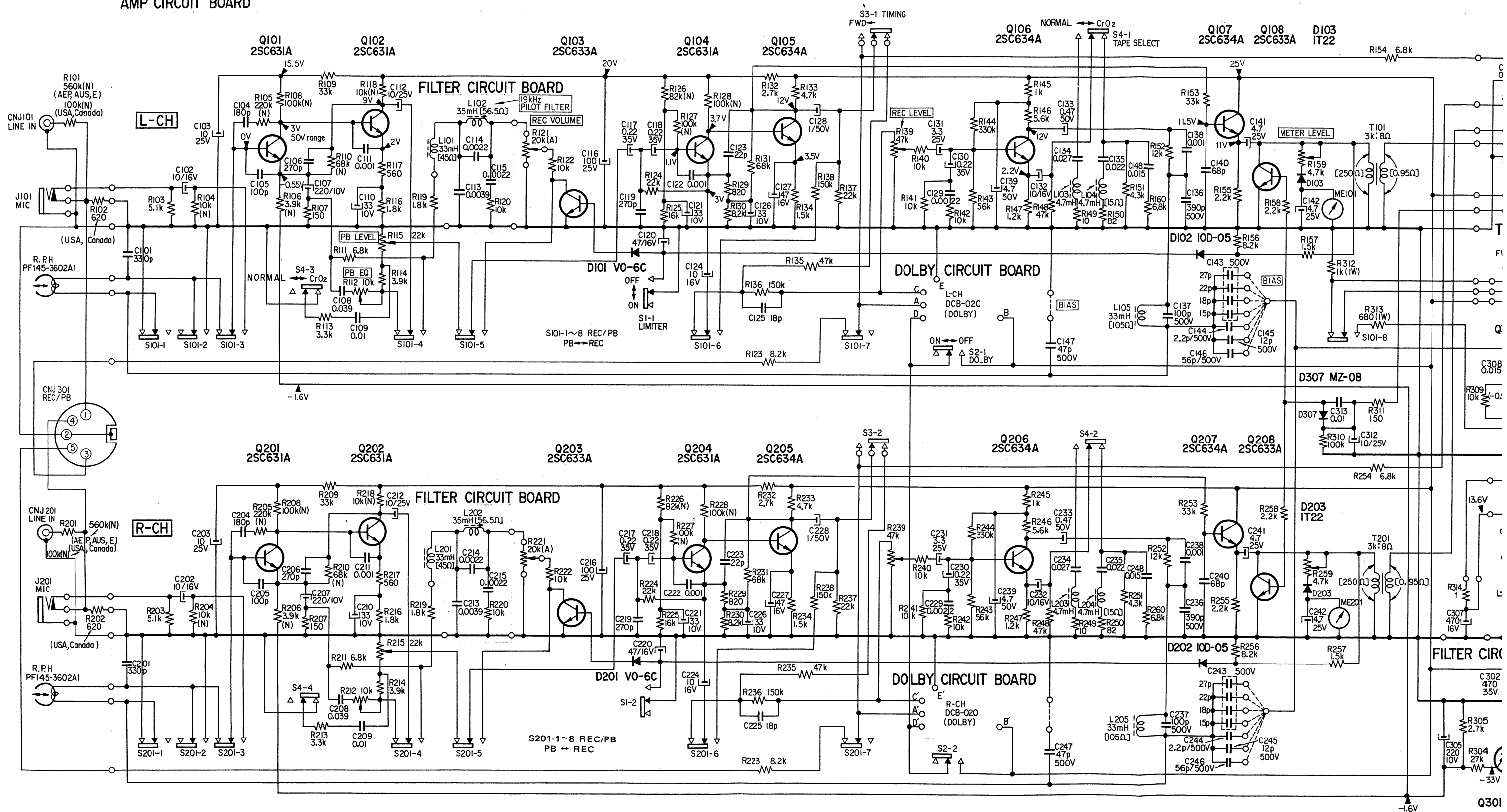
D103, 203 1T22
D501, 601 1T22A
502, 602 1T22A
D503, 603 1S1555
504, 604 1S1555

D101, 201 VO6C
D102, 202 10D-05
D306 MZ08

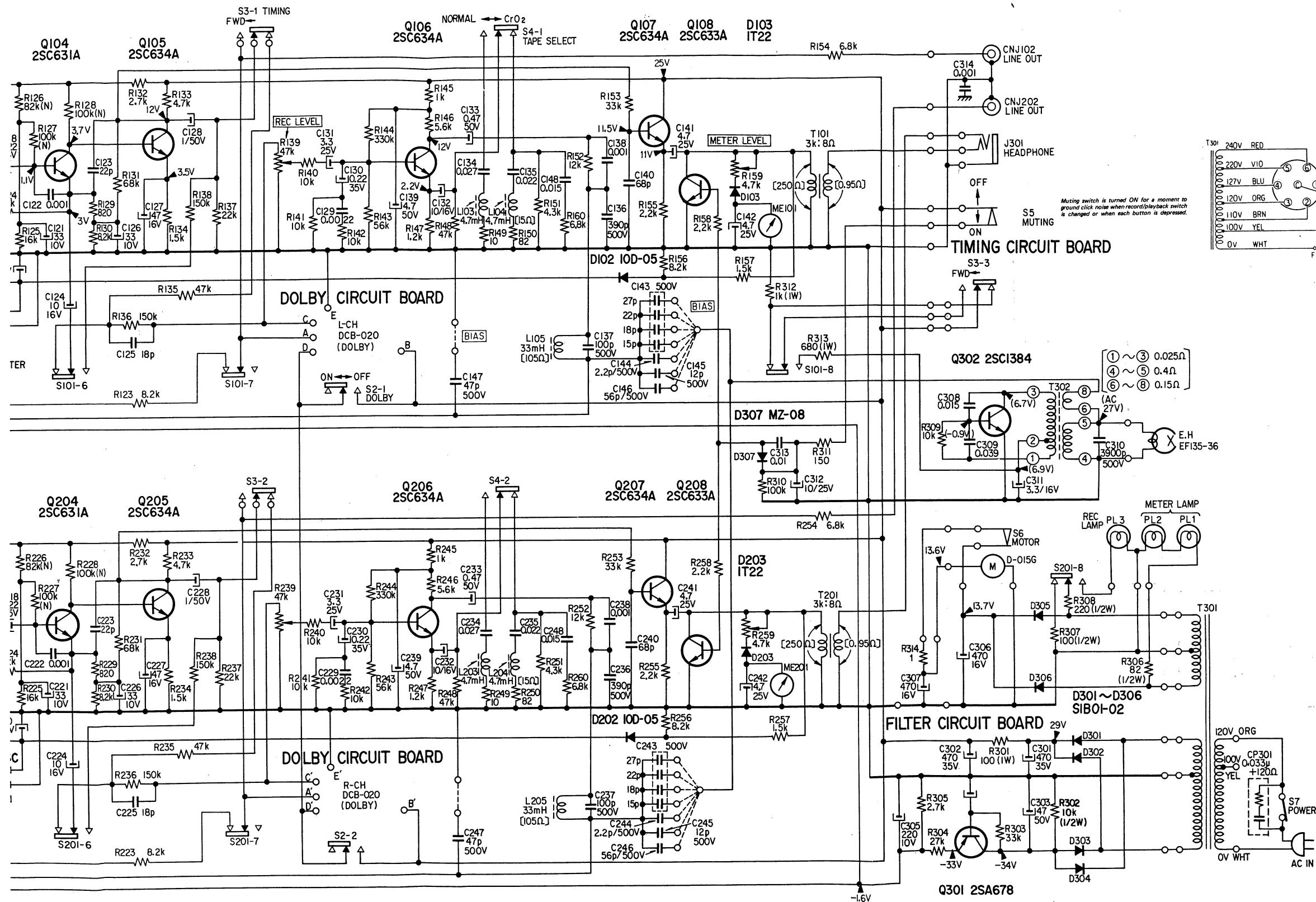
Q301 2SA678
Q302 2SC1384
D301~306 SIB01-02

4. SCHEMATIC DIAGRAM

— Amp Circuit —
AMP CIRCUIT BOARD



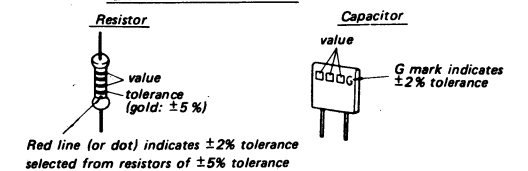
Red Line Circuit: AEP, E, AUS



Note:

- All resistors and capacitors are in Ω and μF unless otherwise specified.
- Letter in () suffixed to variable resistor value indicates characteristics.
- --- : chassis ground
- Components for R-CH have the same values as for L-CH.
- (N) : Low noise resistor
- Voltage values shown are measured with a voltmeter (20k Ω /V). Variations may be noted due to normal production tolerances.
- no mark : stop mode
- () : record mode
- AC voltage values across heads are measured with a VTVM in record mode.
- When replacing resistors and capacitors needing $\pm 2\%$ tolerance, use only those with red line (or dot) or G mark, as DOLBY system requires precise circuit operation.

2% Tolerance Identification

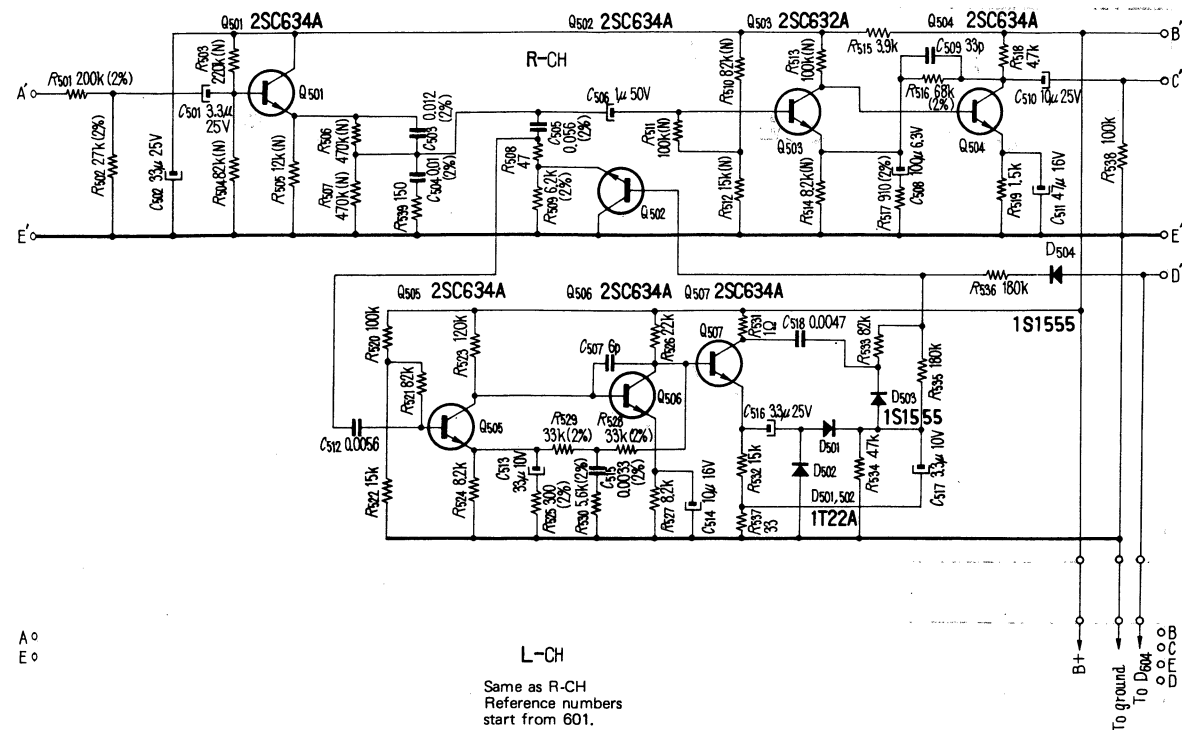


Switch mode:

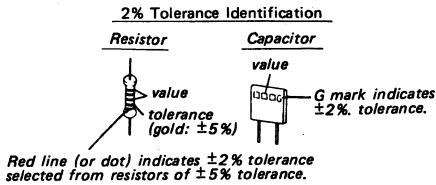
Ref. No.	Switch	Mode
S101, 201	record/playback	playback
S1	LIMITER	ON
S2	DOLBY NR	ON
S3	timing	STOP
S4	TAPE SELECT	CrO ₂
S5	muting	OFF
S6	motor	OFF
S7	POWER	ON

5. SCHEMATIC DIAGRAM

— DOLBY Circuit —



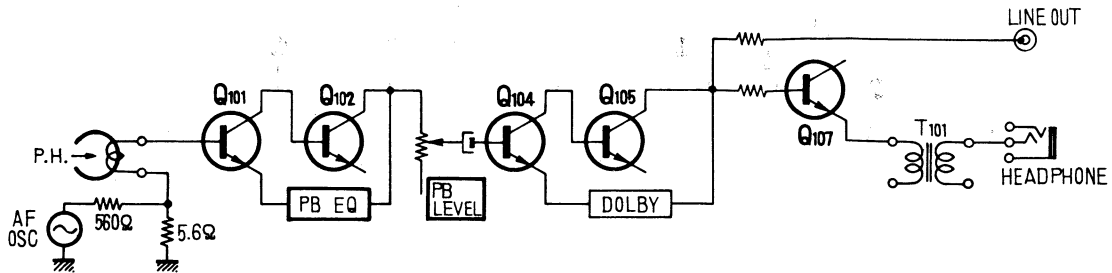
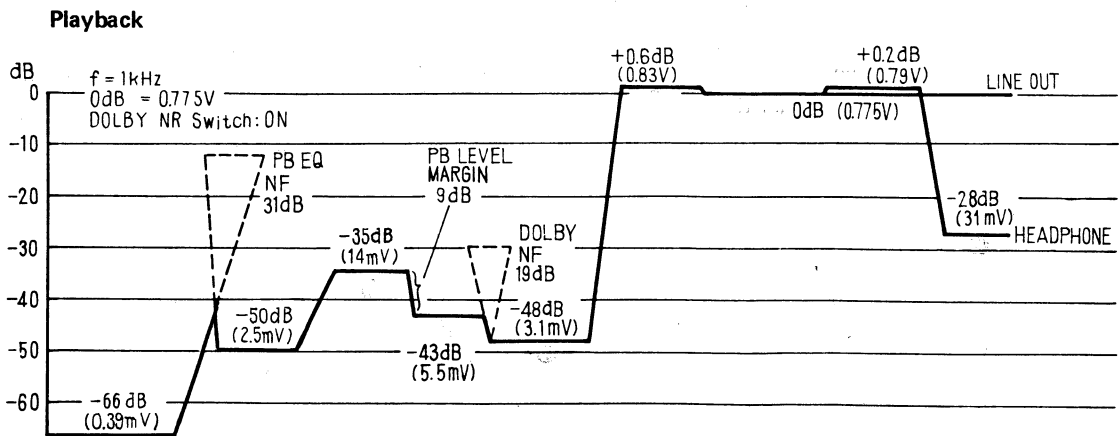
- Note:
1. All resistors and capacitors are rated in Ω and μF unless otherwise indicated.
 2. The letter (N) which is suffixed to rating values shows a low noise resistor.
 3. Voltage values shown are measured with a voltmeter (20k Ω /V) in playback mode. Variations may be noted because of normal production tolerances.
 4. Components for R-CH are the same value as for L-CH.
 5. When replacing resistors and capacitors needing $\pm 2\%$ tolerance, use only those with red line (or dot) or G mark, as DOLBY system requires precise circuit operation.



6. CHANGED PORTIONS OF ELECTRICAL ADJUSTMENT

Page	Former	New
20	4. Playback Equalizer Adjustment Adjust R114 (L-CH) R214 (R-CH)	R112 (L-CH) R212 (R-CH) Note: After the playback equalizer adjustment, setting the TAPE SELECT switch to CrO ₂ , play back the SONY test tape P-4-A81 and ensure that VTVM reading drops 4.5 dB \pm 1 dB.
21	7. Record Bias Adjustment Input signal (1) 1 kHz, -90 dB (25 μV)	750 Hz, -90 dB (25 μV)
22	8. Record Level Adjustment Adjust R139 (L-CH) R239 (R-CH)	R140 (L-CH) R240 (R-CH)

7. CHANGED PLAYBACK LEVEL DIAGRAM



6. CHANGED PORTIONS OF ELECTRICAL ADJUSTMENT

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7. CHANGED PLAYBACK LEVEL DIAGRAM

